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A DECADE OF CHANGE

Growth Trends in the Greater Boston Area — 1990 to 2000

Metropolitan Area Planning Council

A DECADE OF CHANGE

Growth Trends in the Greater Boston Area from 1990 to 2000

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MAPC

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EXECUTIVE SUMMARY

The 101 cities and towns served by the Metropolitan Area Planning Council (MAPC) experienced significant changes during the last decade of the twentieth century. Although the decade began in the midst of a recession, the recovery period between 1992 and 1995 led to a thriving economy in the second half of the 1990s.

By the turn of the millennium, the Boston metropolitan region was experiencing population growth and diversification, an expanded job market, an increasingly tight housing market, and the vast consumption of land in low-density areas. An understanding of the nature of these changes and of the complex character of our region is critical to the ability of legislators, administrators, public and private agencies, and the general public to make informed decisions. With this in mind, MAPC presents Decade of Change, a report highlighting growth trends that occurred within Massachusetts and the Boston metropolitan area in the 1990s.

While growth and development may have very positive benefits, these factors also exacerbate competition for limited resources such as land, water, and municipal revenues and strain the capacity of our transportation and education systems. To minimize these negative impacts, it is critical to plan collectively for the future of our cities and towns within a regional context. Effective regional planning requires an understanding of how our communities are changing and the challenges that the region will face in safeguarding our economic vitality and quality of life.

Decade of Change illuminates these challenges through careful analysis and documentation of trends that occurred during the 1990s. Specifically, this report presents data to explore seven inter-connected issue areas: Demographics, Employment, Housing, Education, Community Vitality, Transportation, and Environmental Resources. Some key findings identified in this report include:

- The MAPC region's population grew 4.9% in the 1990s to total over 3 million residents, nearly **quadrupling its pace of growth** from the 1980s.
- The region saw significant changes in age: **the number of people under age 18 grew at a faster pace** than in the state or nation.
- The region experienced shifts in racial and ethnic composition: **non-White populations increased significantly** in the 1990s, and, in particular, the number of Asians grew by 76% and people of Hispanic/Latino origin grew by 56%.
- The region experienced a 10.5% increase in employment over the decade, amounting to a **net gain of 177,553 jobs.**
- Although unemployment rates in the region varied, all were below national figures. In 2000, unemployment among the region's communities ranged from 0.9% to 3.9%. The **regional unemployment rate of 2.2% was nearly half the national rate.**

- **Housing prices increased dramatically,** particularly in the second half of the decade, while vacancies declined by 38%. The result was that low-, moderate-, and even middle-income people were being priced out of the market.
- Public education data show that when compared to the state, **the region fares better in terms of Internet access in schools, test scores, and dropout activity.** However, disparities among school districts in resource allocation, student retention, and performance are significant.
- The total number of reported **crimes in the region decreased 40%** over the decade despite population growth.
- **Vehicle miles traveled increased 14%, registered vehicles increased 26%, and annual delay hours increased 52%.** Public transit ridership (subways, buses, and commuter rail) saw an overall increase of 9%, with commuter rail ridership increasing by 90%.
- **22,290 acres of land were developed from 1991 and 1999.** This translates to an average of 7.6 undeveloped acres lost per day, the vast majority of which were developed for single-family homes.
- **44 communities declared water supply emergencies in 1999;** 29 were declared mandatory by the Department of Environmental Protection, while 15 were imposed by the community.
- By 1999, **30 communities in the MAPC region had experienced contamination to their drinking water supplies;** 14 of these had to abandon permanently one or more water sources.

The data and trends presented in the Decade of Change will help public and private leaders think through the multiple impacts of land use and fiscal decisions, plan infrastructure investments, allocate scarce resources, balance competing priorities, and make other choices key to the region's future.

The "top ten" challenges are:

- Balancing growth and resource protection
- Planning ahead so growth happens where there is infrastructure to support it
- Attracting, retaining, and adequately educating people for the jobs of the future
- Providing a mix of housing opportunities that is affordable to a range of incomes and is located near jobs, especially in the suburbs
- Reducing incentives to base land use decisions on fiscal concerns such as school costs
- Ensuring equal opportunity for high-quality education, clean air and water, and good jobs
- Reducing inequities between cities and suburbs
- Engaging citizens in community life
- Promoting transit and other alternatives to single-occupant auto travel
- Encouraging cooperation within and among communities

The findings and challenges outlined in Decade of Change will be used by MAPC as a baseline for developing a revised regional growth strategy. This revision will serve as an update to MetroPlan, which is the metropolitan area's first regional growth plan, adopted by MAPC in 1990. MetroPlan promotes sustainable development and emphasizes the importance of compact development within city and town centers.

As the twenty-first century begins, development of the new regional strategy will engage municipalities, policymakers, advocacy and business groups, and the citizens of the region in a dialogue to shape a collective vision for our future.

ABOUT THE METROPOLITAN AREA PLANNING COUNCIL

The Massachusetts General Court established the Metropolitan Area Planning Council (MAPC) as a state agency in 1963. In 1971, MAPC's legislation was amended to make it an independent public agency. MAPC serves as a regional planning council and a federally designated economic development district pursuant to the Public Works and Economic Development Act (PWEDA) of 1965. In addition, MAPC shares oversight responsibility for the region's federally funded transportation program as one of fourteen members of the Boston Metropolitan Planning Organization (MPO).

The legislative mandate of MAPC is to provide technical and professional resources to improve the physical, social, and economic health in 101 communities in the metropolitan Boston area. It does this through a variety of specialized services including: land use, water resources, transportation, and housing planning; economic development; data analysis and research; legislative policy; and the facilitation and support of inter-local partnerships. MAPC also responds to emerging issues of regional significance through research projects, coalition building, and providing a focus for action.

The organizational philosophy advocates a comprehensive approach to growth and development that strikes the delicate balance between social, economic, and ecological needs. Massachusetts, like other industrial states, is responding to a changing and increasingly competitive global economy. Simultaneously, there is growing awareness that economic growth and development must take into consideration the preservation of our natural environment. MAPC encourages concentrated development patterns around pre-existing infrastructure to provide optimal access to municipal, transportation, and other services while minimizing impacts on the natural environment.

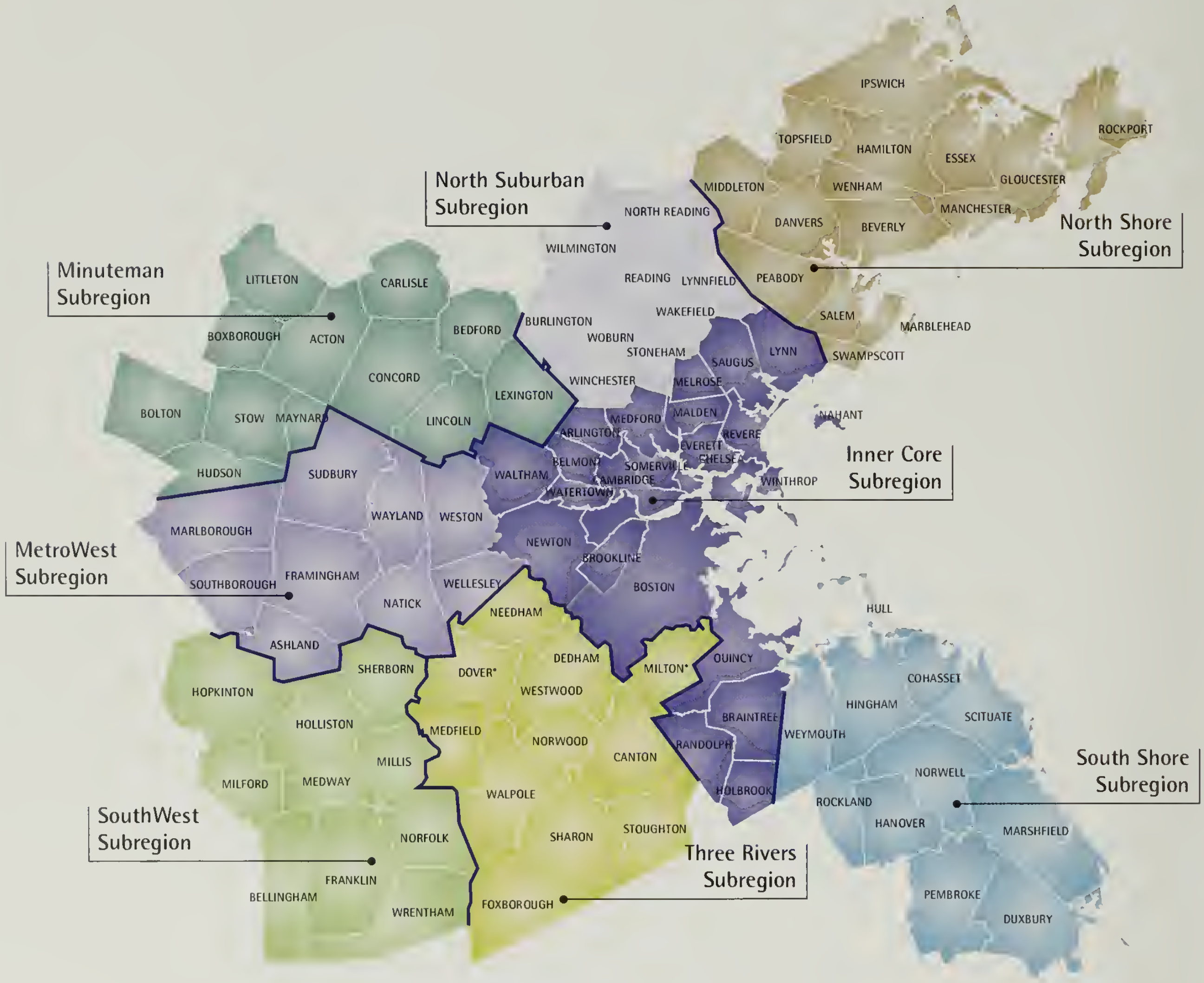
The Council is governed by 101 municipal government appointees, 21 gubernatorial appointees, 10 state officials, and 3 City of Boston officials. An Executive Committee composed of 25 members oversees agency operations. The agency employs approximately 30 professional staff under the leadership of an Executive Director. Funding for Council activities is derived from municipal, state, federal, and private grants and contracts and a per-capita assessment on member municipalities. Due to the diverse sources of funding and leadership, MAPC has the advantage of deliberative processes that include broad-based representation and participation from government, private, non-profit, academic, and faith-based sectors.

The MAPC Region

The region served by MAPC consists of 22 cities and 79 towns in greater Boston. The total land area of the region is 1,422 square miles, stretching west from Boston to include most of the towns inside the I-495 boundary. It encompasses coastal communities, older industrial centers, rural towns, bedroom suburbs, and thriving cities. The population has grown throughout the past decade to total 3,066,394 in 2000. With a 4.9% increase in population between 1990 and 2000, the pace of growth in the region was just slightly slower than Massachusetts as a whole. Although the region served by MAPC represents only 17% of the state's total land area, it contains 48% of Massachusetts' residents.

With approximately 1,876,000 jobs in the region in 2000 – a 10.5% increase since 1990 – the region enjoyed a strong economy as the decade came to a close. This is particularly true along the I-495 corridor. At 2.2%, the 2000 unemployment rate for the region was lower than the state's and nearly half that of the nation. Public school enrollment increased 16% over the decade and currently totals nearly 423,000 students. Metropolitan roadways include 1,148 miles of interstate highways; 5,128 miles of arterials; 2,812 miles of collector roads; and 14,032 miles of local streets. Off-road bike paths run 50 miles, with another 242 miles proposed. The region also encompasses a total of 9 watersheds, 332 river miles, and 137 lakes. In 1999 approximately 57% of the region's total land area was undeveloped, 33% was occupied by single-family housing, 2% was occupied by multi-family housing, and 8% was occupied by commercial and industrial development.

Map 1: The MAPC Region



The MAPC Subregions

To better serve its 101 communities, the MAPC divides the region into eight subregions. Each subregion is led by an organization whose members are appointed by chief elected officials. MAPC staff supports the subregions by providing planning information, organizational experience, and technical expertise to foster project development. The communities in the MetroWest subregion raise funds to pay for a full-time staff person to serve their subregion. The geographic subregion names and their local planning organizations are listed below:

Geographic Area	Name
Inner Core	The Inner Core Committee (Inner Core)
Minuteman	Minuteman Advisory Group on Interlocal Coordination (MAGIC)
MetroWest	MetroWest Growth Management Committee (MetroWest)
North Suburban	North Suburban Planning Council (NSPC)
North Shore	North Shore Task Force (NSTF)
South Shore	South Shore Coalition (SSC)
SouthWest	SouthWest Advisory Planning Committee (SWAP)
Three Rivers	Three Rivers Interlocal Council (TRIC)

ABOUT THIS REPORT

As a regional council with a legislative mandate to facilitate planning efforts among its municipalities, MAPC is responsible for supplying data to inform planning decisions. Decade of Change is an important part of furthering this mission. The purpose of this report is to make key demographic, socioeconomic, and other planning-related data available in a single source and to compare relevant quantitative measures over time. It is meant as a guide to inform decision-makers, a tool for agencies and resident groups, and a data source for citizens. This report does not attempt to evaluate agencies, municipalities, or businesses or the services they provide.

Regional data are compared to state and national figures throughout this report. Because the MAPC region contains 48% of the state's population, changes in the characteristics of the MAPC region will have a significant influence on the state as a whole.

The data in this report were compiled and analyzed by MAPC's Metro Data Center, and all maps were created in coordination with MAPC's Geographic Information Systems (GIS) Lab.

The Data

The choice of topics in Decade of Change was based on three main factors: importance to the region, availability of reliable data, and ability to show changes over time. This report includes the most recent 1990-2000 data available to the Metro Data Center at the time of production.

Much of the data in this report were obtained from non-profit and government agencies in the area. The Metro Data Center at MAPC adds value to these data sets through comparisons with related data and analysis of the results. The majority of the data included in this report was provided by: U.S. Census Bureau, MA Department of Employment and Training, MA Department of Revenue Local Services Division, MA Geographic Information Services, MA Department of Education, and the U.S. Department of Environmental Protection. A complete listing of sources, arranged by section, is presented at the end of the report. In addition, each table, chart, and map includes a citation. Questions about the specific data should be directed to the source cited, while questions about the analysis are welcome at MAPC's Metro Data Center.

Population projections to 2025 were generated at MAPC in 1999 and will be updated in 2002 to reflect the 2000 Census population totals. The Metro Data Center chose not to use commercial third-party vending sources for data in this report with one exception: the 1997 income estimates were produced by Applied Geographic Solutions and are available, along with the methodology, at MassStats.com.

Limitations

Several key data sets were not available for inclusion in this report. The most significant is the Census 2000 Summary File 3 (SF3), which is scheduled for release in the summer of 2002. SF3 includes detailed social and economic characteristics such as educational attainment, poverty status, income, and journey-to-work data. In addition, year 2000 district profile data from MA Department of Education were not available at the time of our analysis.

A second limitation results from the fact that the economy was rapidly changing as Decade of Change was being written. The regional economy, which had been thriving throughout the mid- to late 1990s, began to slow in 2000, as many economists predicted a slowdown or recession ahead; the events of September 11, 2001 exacerbated that trend. Due to the evolving nature of these changes and the fact that they were occurring beyond the decade being studied, the Metro Data Center chose not to address the declining economy in this report. To be sure, however, the impacts of this decline have been particularly strong in the greater Boston area, as high-technology businesses were among those hit the hardest.

A third minor limitation in the Decade of Change is geographical. The data in this report are often aggregated by subregion. This approach is helpful in comparing and contrasting different areas and identifying differences and similarities. The reader should be aware, however, that there may be major differences among and within subregions. The Inner Core, for example, includes more communities than any other subregion and has more than five times as many people. Thus some of its numbers may be out of scale with other subregions. In addition, communities in any given subregion may vary widely. Generalizations about any subregion as a whole tend to mask disparities among its communities.

Another geographical complexity is that some communities choose to be in more than one subregion. To adjust, MAPC has designated such communities to only one subregion to allow for manageable data analysis and presentation. Therefore, Dover, which is in both the Three Rivers and SouthWest subregions, and Milton, which is in both Three Rivers and the Inner Core, were both designated to the Three Rivers subregion; Holliston has been grouped in the SouthWest subregion, even though it is also a dues-paying member of MetroWest.

Limitations notwithstanding, the data, maps, charts, and trends shown here provide much useful information about the region's progress, strengths, and challenges.

Photo: The Boston Greenspace Alliance

SECTION ONE: DEMOGRAPHICS

Demographic information is the basic foundation for local, regional, and statewide planning efforts. Communities within MAPC – and the region itself – experienced significant demographic changes in the past decade. Understanding these changes will help decision-makers at all levels identify needs and set priorities. The following section outlines these trends by looking at population size, age distribution, components of population change, and racial and ethnic composition.

Although MAPC's population has grown at a slower pace than the state's over the past three decades, it is growing at a faster rate than it was ten years ago and has almost caught up with the state's growth rate. Furthermore, although Boston and its core surrounding communities experienced the largest numeric growth, the communities that saw the largest percent change were located outward near the I-495 corridor. This finding does not come as a surprise, considering that the I-495 area has been the locus of many new businesses and a great deal of economic expansion in the region over the decade. However, if this development outward continues without concerted planning efforts that emphasize sustainability, we face the danger of exacerbating many of the problems associated with sprawl such as rising infrastructure costs, traffic congestion, strains on water resources, and loss of open space.

The region has a relatively low percentage of children under age 18, but this group is increasing at a faster pace than in both the state and the nation. This is particularly evident in the fastest growing communities such as Boxborough and Hopkinton, where the population under 18 years old grew by 89% and 71% respectively. Conversely, young adults in the region (people in their 20s and 30s) are on the decline. This is a national trend, resulting from the fact that there are fewer adults of childbearing age in the "baby bust" generation that follows the baby boomers. The existence of more children and fewer young adults will have an impact on public school and higher education enrollment, municipal budgets, community services and recreational needs, and immediate and long-term workforce development.

A look at racial and ethnic composition shows that the MAPC region is diversifying at a rapid pace. Asian and Hispanic populations are increasing rapidly in all subregions. Chelsea and Boston both became "minority majority" cities for the first time, meaning that minority[1] populations, when combined, outnumber the non-Hispanic White population. A diversifying population may have significant implications in such areas as community development, social programs, and educational curriculum.

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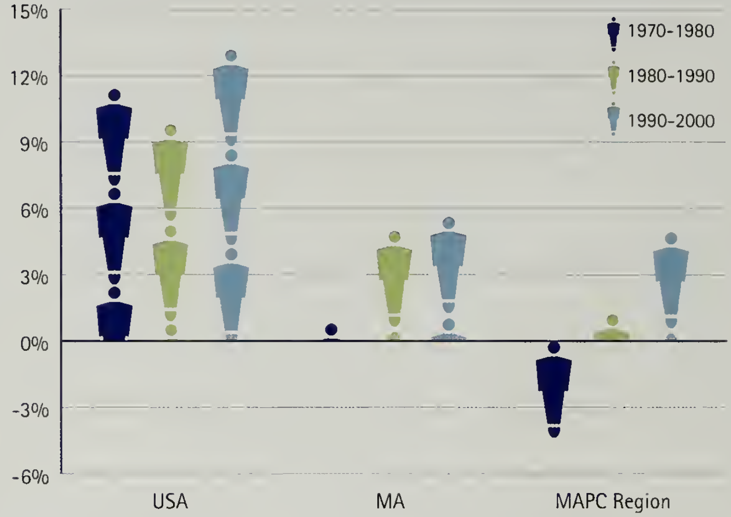
[1] MAPC uses the word "minority" in accordance with accepted terminology of the Office of Equal Employment Opportunities: "minority" refers to all persons who are not 'non-Hispanic White'. MAPC recognizes that the term is not always accurate, such as in situations where "minorities" actually make up the majority.

POPULATION GROWTH

Chart 1-1 provides a historical comparison of population growth in the nation, the state, and the MAPC region. National growth has outpaced both Massachusetts and the MAPC region since 1970, as movement toward the southern and western parts of the country in particular increased[2]. The MAPC region lost population in the 1970s and grew slowly in the 1980s. By the 1990s, the pace of growth in the MAPC region was almost equal to that of the state.

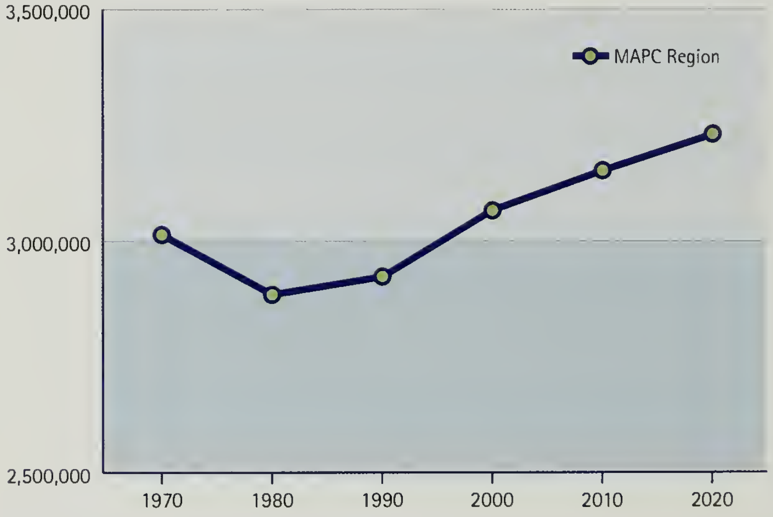
Chart 1-1: Historical Percent Population Change for the USA, MA, and MAPC Region, 1970-2000



Source: U.S. Census Bureou

Chart 1-2 shows the growth of the MAPC region using U.S. Census counts from 1970 to 2000 and MAPC population projections into the year 2020. The U.S. Census Bureau counted 3,066,394 people in the MAPC region on April 1, 2000, an increase of 4.9% from 1990. MAPC's Metro Data Center projects steady growth in the next two decades, increasing by 2.8% between 2000 and 2010 and 2.5% between 2010 and 2020[3].

Chart 1-2: Population Estimates and Projections for the MAPC Region, 1970-2020



Source: U.S. Census Bureou; 2010-2020 MAPC Doto Center Projections

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[2] Following the release of the 2000 Census data, the U.S. Census Bureau reported the fastest growing regions in the nation between 1990 and 2000 were the West (19.7%) and the South (17.3%).

[3] MAPC's projections in Chart 1-2 do not reflect adjustments due to the release of the 2000 Census and are currently in the process of being updated.

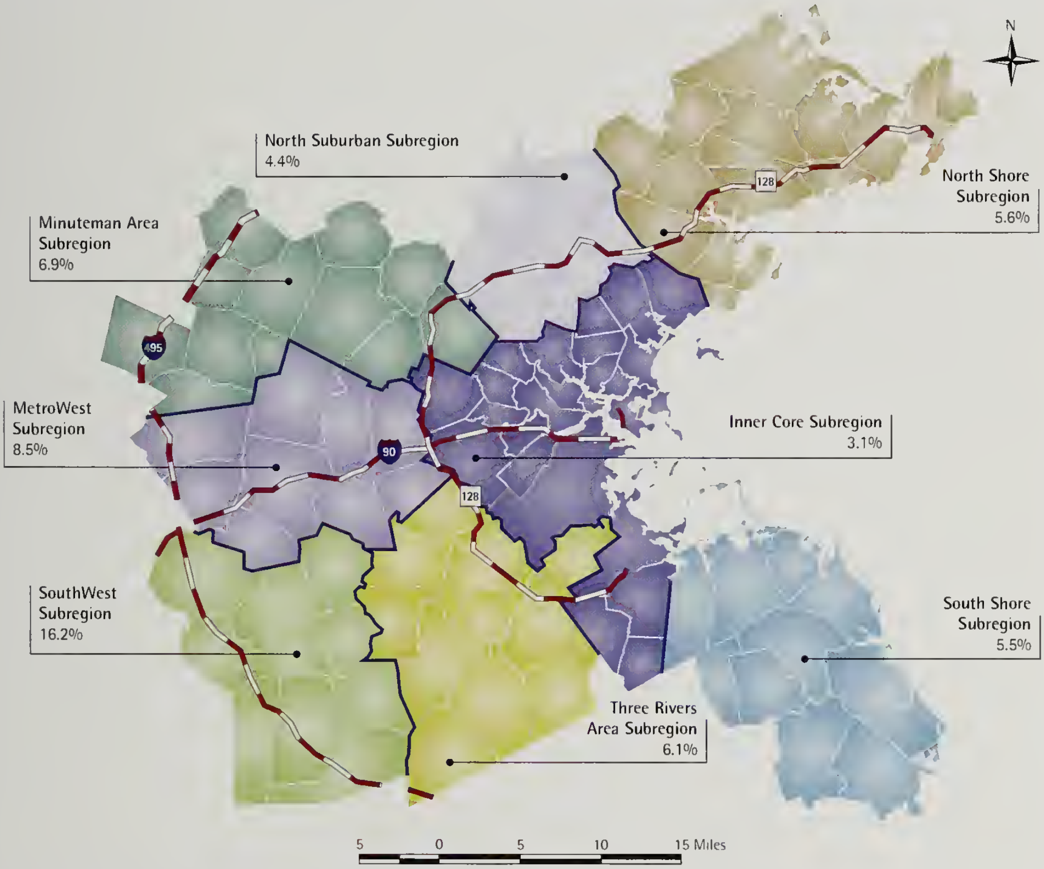
Photo: The Boston Foundation

Although MAPC's population has grown at a slower pace than the state's over the past three decades, it is growing at a faster rate than it was ten years ago.

How fast did each subregion grow over the decade?

Map 1-1 shows the percent change in population for each MAPC subregion since 1990. Population has grown in all subregions since 1990, although more in some than in others. In terms of pace, the slowest growth took place in the Inner Core, followed by the North Suburban and South Shore subregions. The remaining five subregions in the MAPC region grew at a faster rate than Massachusetts as a whole. The region's fastest growing subregion, the SouthWest, outpaced national growth by three percentage points.

Map 1-1: Growth Rate by Subregion, 1990-2000



Source: U.S. Census Bureau

The region has a relatively low percentage of children under age 18, but this group is increasing at a faster pace than in both the state and the nation.

Tables 1-1 through 1-8 illustrate the growth activity by subregion, ranking the individual cities and towns within each subregion from largest to smallest percent change.

The Inner Core Subregion

As the hub of activity in Massachusetts, the Inner Core attracted more new residents during the 1990s than the other subregions, increasing its population by 48,556 residents. Although the Inner Core is the most populous subregion in the MAPC region, it grew at a slower rate (3%) over the decade than the other subregions. Eight Inner Core communities experienced a loss in population, led by Arlington with a loss of 2,241 residents. Contributing factors to population loss in Arlington and other Inner Core communities include a decrease in family households, fewer children, and an increase in single householders. New immigrants and larger families, along with the availability of more rental housing stock at more affordable prices, drove growth in the fastest growing Inner Core communities.

Table 1-1: Growth in the Inner Core Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.5	332,672
	MAPC Region	2,922,934	3,066,394	4.9	143,460
	Inner Core	1,579,452	1,628,008	3.1	48,556
1	Chelsea	28,710	35,080	22.2	6,370
2	Revere	42,786	47,283	10.5	4,497
3	Lynn	81,245	89,050	9.6	7,805
4	Everett	35,701	38,037	6.5	2,336
5	Cambridge	95,802	101,355	5.8	5,553
6	Malden	53,884	56,340	4.6	2,456
7	Brookline	54,718	57,107	4.4	2,389
8	Quincy	84,985	88,025	3.6	3,040
9	Randolph	30,093	30,963	2.9	870
10	Boston	574,283	589,141	2.6	14,858
11	Waltham	57,878	59,226	2.3	1,348
12	Saugus	25,549	26,078	2.1	529
13	Somerville	76,210	77,478	1.7	1,268
14	Newton	82,585	83,829	1.5	1,244
15	Winthrop	18,127	18,303	1.0	176
16	Braintree	33,836	33,828	-0.02	16
17	Watertown	33,284	32,986	-0.90	-298
18	Belmont	24,720	24,194	-2.13	-526
19	Holbrook	11,041	10,785	-2.32	-256
20	Medford	57,407	55,765	-2.86	-1,642
21	Melrose	28,150	27,134	-3.61	-1,016
22	Arlington	44,630	42,389	-5.02	-2,241
23	Nahant	3,828	3,632	-5.12	-196

Source: U.S. Census Bureau

The Minuteman Subregion

The Minuteman subregion grew at a slightly faster pace than the region and the state, largely due to significant growth in towns intersected by or close to I-495, particularly Boxborough, Bolton, and Littleton. Acton had the largest numeric increase in population in the subregion, adding 2,459 people to bring its population to just over 20,000. Concord and Bedford each had slight decreases in population.

Table 1-2: Growth in the Minuteman Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.50	332,672
	MAPC Region	2,922,934	3,066,394	4.90	143,460
	Minuteman	135,331	144,695	6.90	9,364
1	Boxborough	3,343	4,868	45.60	1,525
2	Bolton	3,134	4,148	32.40	1,014
3	Littleton	7,051	8,184	16.10	1,133
4	Acton	17,872	20,331	13.80	2,459
5	Stow	5,328	5,902	10.80	574
6	Carlisle	4,333	4,717	8.90	384
7	Hudson	17,233	18,113	5.10	880
8	Lincoln	7,666	8,056	5.10	390
9	Lexington	28,974	30,355	4.80	1,381
10	Maynard	10,325	10,433	1.00	108
11	Concord	17,076	16,993	-0.49	-83
12	Bedford	12,996	12,595	-3.09	-401

Source: U.S. Census Bureau

The MetroWest Subregion

Table 1-3: Growth in the MetroWest Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.50	332,672
	MAPC Region	2,922,934	3,066,394	4.90	143,460
	MetroWest	209,053	226,813	8.50	17,760
1	Southborough	6,628	8,781	32.50	2,153
2	Ashland	12,066	14,674	21.60	2,608
3	Sudbury	14,358	16,841	17.30	2,483
4	Marlborough	31,813	36,255	14.00	4,442
5	Weston	10,200	11,469	12.40	1,269
6	Wayland	11,874	13,100	10.30	1,226
7	Natick	30,510	32,170	5.40	1,660
8	Framingham	64,989	66,910	3.00	1,921
9	Wellesley	26,615	26,613	-0.01	-2

Source: U.S. Census Bureau

MetroWest was the second fastest growing subregion among the eight. Southborough, Ashland, and Sudbury led the MetroWest communities in percentage growth, while Marlborough led in numeric growth; these four are the outermost communities in the subregion, closest to I-495 and its expanding job opportunities. Wellesley exhibited the slowest growth in the subregion.

The North Suburban Subregion

Table 1-4: Growth in the North Suburban Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.50	332,672
	MAPC Region	2,922,934	3,066,394	4.90	143,460
	North Suburban	190,006	198,417	4.40	8,411
1	Wilmington	17,651	21,363	21.0	3,712
2	North Reading	12,002	13,837	15.3	1,835
3	Reading	22,539	23,708	5.2	1,169
4	Woburn	35,943	37,258	3.7	1,315
5	Winchester	20,267	20,810	2.7	543
6	Lynnfield	11,274	11,542	2.4	268
7	Stoneham	22,203	22,219	0.1	16
8	Wakefield	24,825	24,804	-0.08	-21
9	Burlington	23,302	22,876	-1.83	-426

Source: U.S. Census Bureau

The North Suburban subregion grew by 4.4% over the decade, slightly slower than the region as a whole. Burlington and Wakefield exhibited a small numeric loss in population. This loss, and slow growth in other communities, was offset by high growth in Wilmington, which increased its 1990 population by 21% and reached a total of over 21,000 people.

The North Shore Subregion

Table 1-5: Growth in the North Shore Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.50	332,672
	MAPC Region	2,922,934	3,066,394	4.90	143,460
	North Shore	259,904	274,561	5.60	14,657
1	Middleton	4,921	7,744	57.40	2,823
2	Hamilton	7,280	8,315	14.20	1,035
3	Ipswich	11,873	12,987	9.40	1,114
4	Topsfield	5,754	6,141	6.70	387
5	Salem	38,091	40,407	6.10	2,316
6	Swampscott	13,650	14,412	5.60	762
7	Gloucester	28,716	30,273	5.40	1,557
8	Wenham	4,212	4,440	5.40	228
9	Beverly	38,195	39,862	4.40	1,667
10	Danvers	24,174	25,212	4.30	1,038
11	Rockport	7,482	7,767	3.80	285
12	Peabody	47,039	48,129	2.30	1,090
13	Marblehead	19,971	20,377	2.00	406
14	Essex	3,260	3,267	0.20	7
15	Manchester-by-the-Sea	5,286	5,228	-1.10	-58

Source: U.S. Census Bureau

All North Shore communities experienced population growth except for Manchester-by-the-Sea, which shows a small loss in population. The communities with the highest growth rates since 1990, Middleton and Hamilton, are fairly small in terms of population size. The larger communities, such as Salem, Peabody, and Beverly experienced more modest growth rates; nonetheless, together they contributed about a third of the population increase in the subregion.

The South Shore Subregion

Table 1-6: Growth in the South Shore Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.50	332,672
	MAPC Region	2,922,934	3,066,394	4.90	143,460
	South Shore	195,495	206,142	5.40	10,647
1	Pembroke	14,544	16,927	16.40	2,383
2	Marshfield	21,531	24,324	13.00	2,793
3	Hanover	11,912	13,164	10.50	1,252
4	Rockland	16,123	17,670	9.60	1,547
5	Scituate	16,786	17,863	6.40	1,077
6	Hull	10,466	11,050	5.60	584
7	Norwell	9,279	9,765	5.20	486
8	Cohasset	7,075	7,261	2.60	186
9	Duxbury	13,895	14,248	2.50	353
10	Hingham	19,821	19,882	0.30	61
11	Weymouth	54,063	53,988	-0.14	-75

Source: U.S. Census Bureau

In the South Shore, every community but Weymouth experienced population growth. Pembroke and Marshfield led the subregion in both percentage and numeric change, adding a combined total of over 5,000 new residents. The other eight communities in the subregion combined to contribute another 5,000 new residents.

The SouthWest Subregion

Table 1-7: Growth in the SouthWest Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.50	332,672
	MAPC Region	2,922,934	3,066,394	4.90	143,460
	SouthWest	124,253	144,384	16.2	20,131
1	Hopkinton	9,191	13,346	45.20	4,155
2	Franklin	22,095	29,560	33.80	7,465
3	Medway	9,931	12,448	25.30	2,517
4	Wrentham	9,006	10,554	17.20	1,548
5	Norfolk	9,270	10,460	12.80	1,190
6	Holliston	12,926	13,801	6.80	875
7	Milford	25,355	26,799	5.70	1,444
8	Sherborn	3,989	4,200	5.30	211
9	Millis	7,613	7,902	3.80	289
10	Bellingham	14,877	15,314	2.90	437

Source: U.S. Census Bureau

The Southwest subregion exhibited the fastest growth of all subregions with a 16.2% increase since 1990 and a total gain of 20,131 people. Economic expansion was largely responsible for attracting this fast-paced residential growth, as large office parks sprouted up along I-495 throughout the decade. Hopkinton and Franklin added almost 12,000 people to the subregion, well over half of its total growth. Franklin replaced Milford as the SouthWest subregion's most populous town, nearing 30,000 residents. None of the SouthWest's ten communities lost population.

The Three Rivers Subregion

Table 1-8: Growth in the Three Rivers Subregion, Ranked by Percent Change

Rank	Community	1990 Census	2000 Census	Percent Change	Absolute Change
	MA	6,016,425	6,349,097	5.50	332,672
	MAPC Region	2,922,934	3,066,394	4.90	143,460
	Three Rivers	229,440	243,374	6.10	13,934
1	Medfield	10,531	12,273	16.50	1,742
2	Dover	4,915	5,558	13.10	643
3	Walpole	20,212	22,824	12.90	2,612
4	Westwood	12,557	14,117	12.40	1,560
5	Sharon	15,517	17,408	12.20	1,891
6	Canton	18,530	20,775	12.10	2,245
7	Foxborough	14,637	16,246	11.00	1,609
8	Needham	27,557	28,911	4.90	1,354
9	Stoughton	26,777	27,149	1.40	372
10	Milton	25,725	26,062	1.30	337
11	Norwood	28,700	28,587	-0.39	-113
12	Dedham	23,782	23,464	-1.34	-318

Source: U.S. Census Bureau

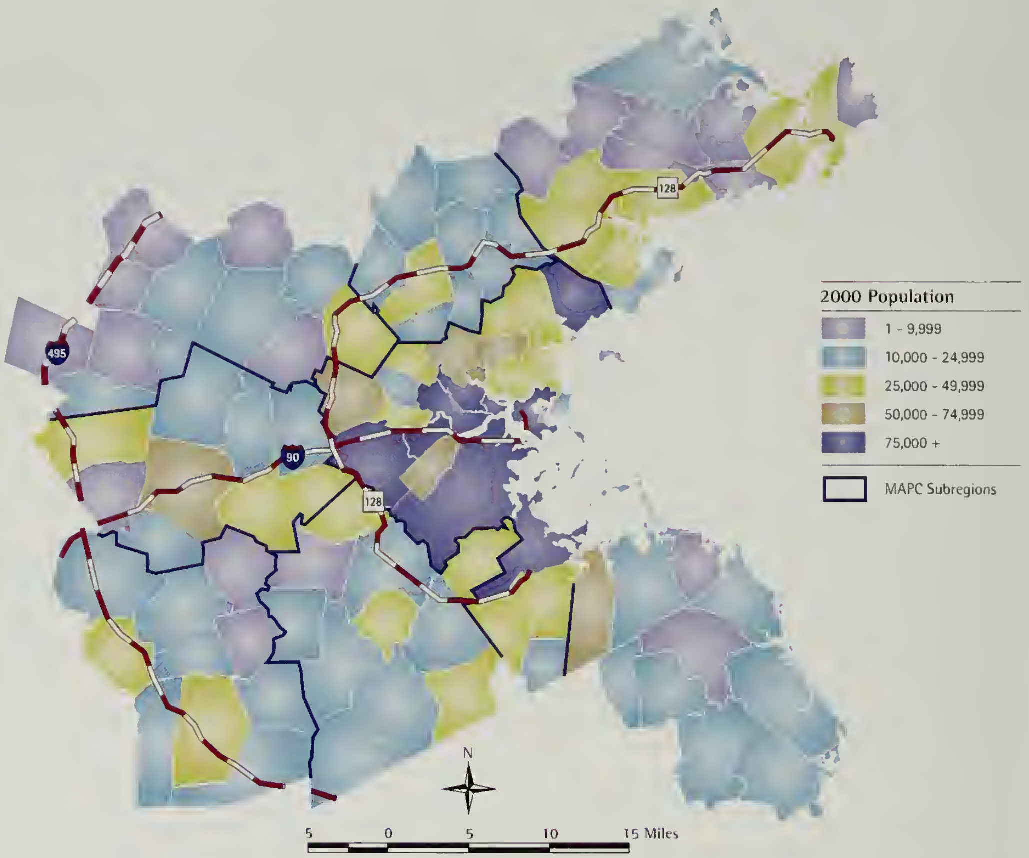
The Three Rivers subregion grew 6.1% over the decade. The highest percent change was in Medfield and the highest numeric change was in Walpole. Seven communities in the subregion gained population by more than a 1,000 people, while Norwood and Dedham both experienced a small loss in population.

(Map 1-2 displays the population distribution for communities within the MAPC region. Boston and Cambridge remained the two most populous areas, combining to make up 23% of the MAPC region's population. Lynn replaced Quincy as the 3rd most populous city with just over 89,000 people, Quincy ranked 4th, and Newton ranked 5th. Framingham is the most populous community outside of the Inner Core, nearing 67,000, followed by Weymouth. Essex replaced Bolton as the

Photo: The Boston Foundation

The MAPC region lost population in the 1970s and grew slowly in the 1980s. By the 1990s, the pace of growth in the MAPC region was almost equal to that of the state.

Map 1-2: Total Population by Community, 2000



Source: U.S. Census Bureau

town with the fewest people, followed by Nahant, Bolton, and Sherborn. Each of these communities had less than 4,000 residents. Boxborough, which ranked 3rd lowest in population in 1990, increased its 2000 population by 45% to become 7th lowest in population.

DENSITY

Table 1-9: Change in Densities, 1900-2000

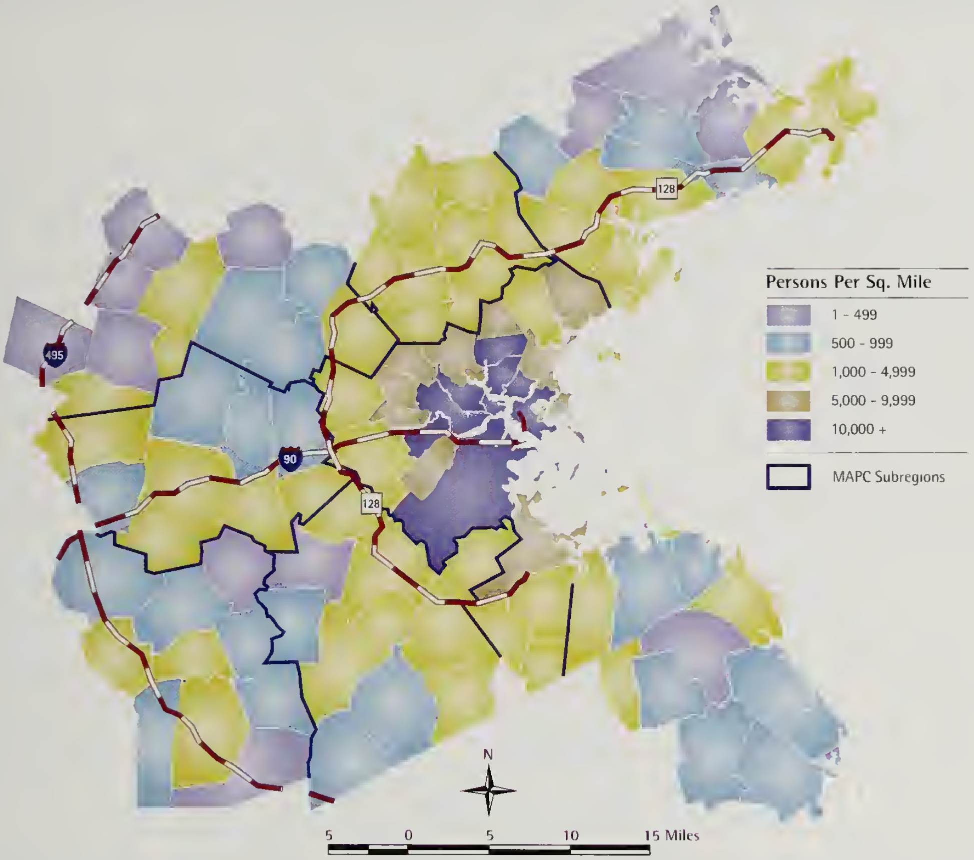
Geography	PERSONS PER SQUARE MILE			
	1990	2000	Total Increase	% Increase
USA	70	80	10	13.2%
MA	767	810	42	5.5%
MAPC Region	2,078	2,180	102	4.9%
Inner Core	7,416	7,644	228	3.1%
Minuteman	727	778	50	6.9%
MetroWest	1,352	1,466	115	8.5%
North Suburban	2,009	2,097	89	4.4%
North Shore	1,299	1,372	73	5.6%
South Shore	1,028	1,084	56	5.4%
SouthWest	684	795	111	16.2%
Three Rivers	1,232	1,306	75	6.1%

Source: U.S. Census Bureau

Table 1-9 shows the change in population and its impact on density for various areas. The nation experienced the fastest growth rate over the decade and has the lowest density. Conversely, the MAPC region had the slowest percentage growth and exhibits the highest density.

The number of people per square mile in the region was almost three times that of the state in both 1990 and 2000, although the region declined slightly by comparison during that time. The region's high density is largely the result of the heavy concentration of people in Boston and its surrounding cities and towns. The Inner Core, with an average of 7,644 residents per square mile, has 27% higher density than its nearest competitor, North Suburban, which has the second highest density. The SouthWest subregion, which had the lowest density in 1990, has been replaced at the low end by Minuteman, which gained in density at a faster pace than many of the other subregions.

Map 1-3: Population Density by Community, 2000



Source: U.S. Census Bureau; MassGIS

Map 1-3 illustrates the densities in the individual cities and towns in the MAPC region. The densest areas are those closest to Boston and the Inner Core. Somerville has the highest density of the 101 cities and towns in the region, with 77,478 people fitting into 4.1 square miles, or 18,868 persons per square mile. Chelsea ranks 2nd with a density of 16,037 persons per square mile, followed by Cambridge, Boston, Everett, and Malden, all with over 10,000 persons per square mile. The most sparsely populated towns are toward the periphery of the region, led by Bolton, which has 208 persons per square mile, followed by Essex, Sherborn, Carlisle, Stow, Dover, and Ipswich, all with under 400 persons per square mile.

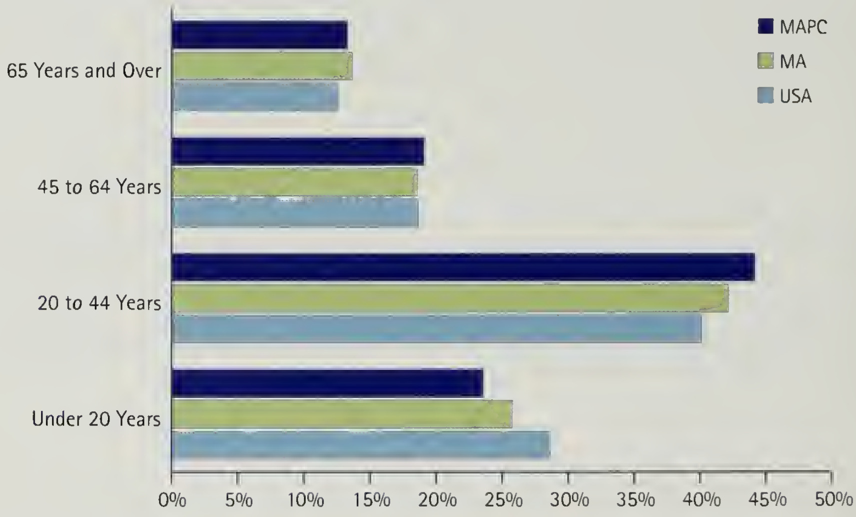
... a growing elderly population may affect health care demands, housing needs, and other services.

AGE

Age distribution has profound planning implications for a community. Rapid growth in the number of children, for example, will increase demands placed on schools; a shrinking young adult population may signify a strained labor force; and a growing elderly population may affect health care demands, housing needs, and other services. Chart 1-3 compares the age distribution of the region with that of the state and nation.

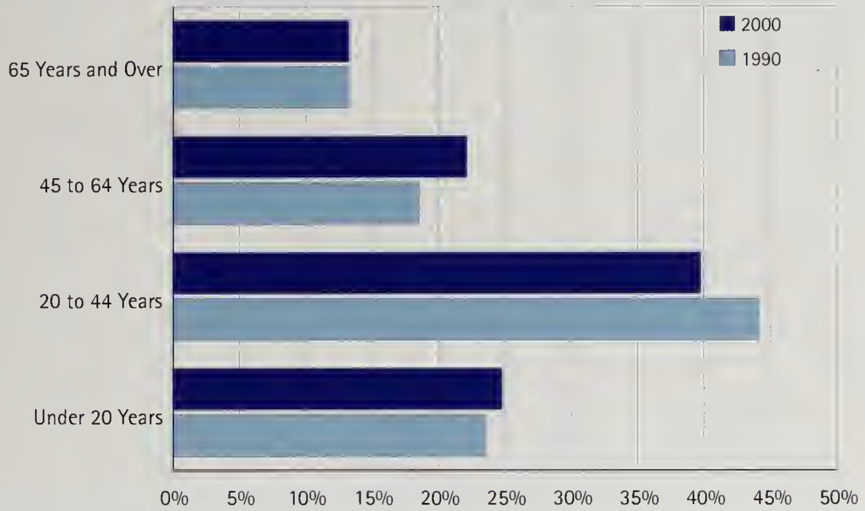
Chart 1-3 shows that the MAPC region has a smaller percentage of young people than the state and nation and a higher percentage of young adults and people of working age. This reflects the influence of Boston and its immediate surrounding communities, which attract working families and young adults who wish to take advantage of the many higher education and employment opportunities.

Chart 1-3: Age Distribution in the USA, MA and MAPC Region, 2000



Source: MISER Components of Estimoted Populotion Chonge, July 1, 1990 - June 30, 1995

Chart 1-4: Age Distribution in the MAPC Region, 1990 and 2000



Source: U.S. Census Bureau

Chart 1-4 highlights changes in the regional age distribution over time and shows that our population under 20 years old is currently on the rise, while our young adult population has declined over the decade. In fact, the region had nearly 70,000 fewer people aged 20 to 44 in 2000 than in 1990. This is particularly significant since those are the primary years for childbearing and entrance into the workforce. This is not unique to the region, however, as Massachusetts and the nation experienced the same trend as the post-baby-boomers of the 70s and early 80s reached adulthood. Nonetheless, the state and the region lost proportionately more people in the 20-34-year-old range than the nation as a whole, and gained proportionately fewer in the 35-44-year-old range.

The population aged 65 years and over represents 13% of the total population in the region, which is slightly less than the state but more than the nation. The percentage of people in this age group has remained unchanged since 1990.

What do we know about growth among our region's young people?

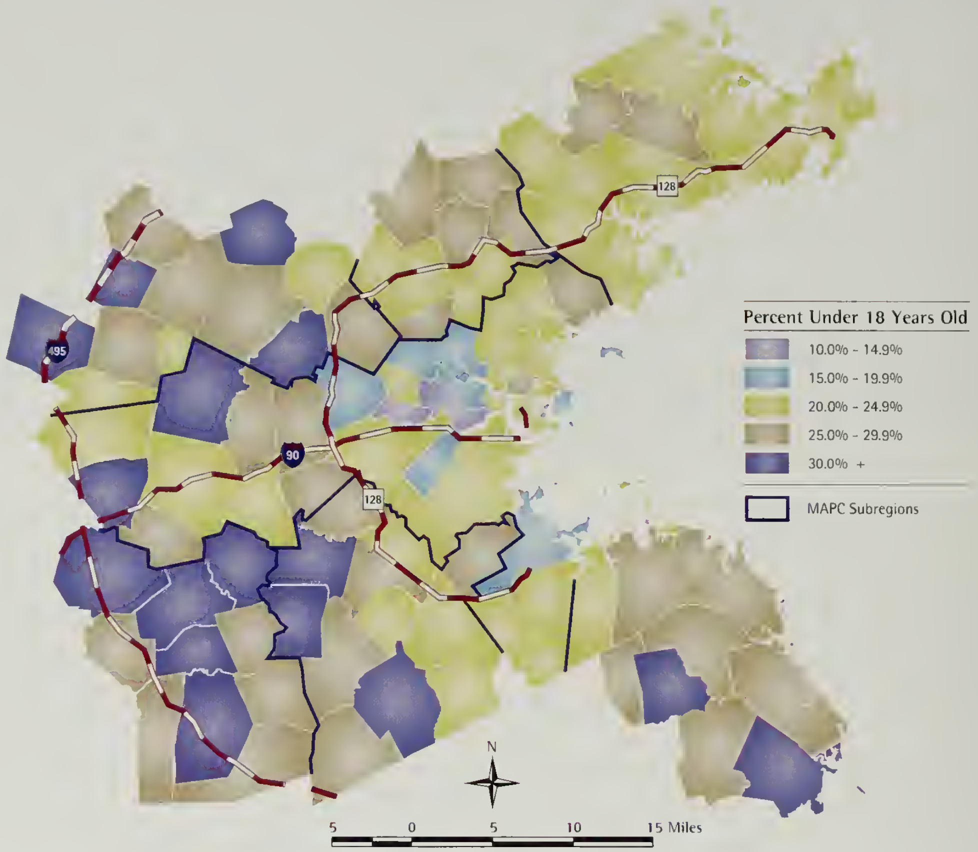
Table 1-10 emphasizes the difference between the United States, Massachusetts, and the MAPC region in terms of their percentage of young people. It shows that Massachusetts, and the MAPC region in particular, has a smaller percentage of children than the national average; however, this population is growing at a faster rate in the region than in the state as a whole.

Table 1-10: Population Under 18 Years Old

Area	% Under 18 in 2000	% Change 1990-00
USA	25.7%	13.7%
MA	23.6%	10.9%
MAPC Region	22.1%	13.8%

Source: U.S. Census Bureau

Map 1-4: Percentage Under 18 Years Old by Community, 2000



Source: U.S. Census Bureau

Map 1-4 illustrates the communities with the highest and lowest percentages of children under 18 years of age. Families with children clearly are more highly concentrated near the I-495 corridor. Conversely, the 12 communities with the lowest percentage of children are all located in the Inner Core, the lowest being Cambridge, with only 13% of its population under 18 years of age. This is primarily due to the large concentration of college and university students and young, single adults living in Cambridge and its surrounding areas. Cambridge is also one of only six communities that experienced an actual loss in number of people under 18.

Table 1-11: Top 10 Communities with Highest Percent Under 18 Years Old, 2000

Subregion	City/Town	% Under 18	# Under 18	% Increase from 1990
Three Rivers	Medfield	33.6%	4,122	45%
SouthWest	Hopkinton	33.1%	4,417	71%
MetroWest	Sudbury	32.5%	5,476	42%
MetroWest	Southborough	32.1%	2,818	68%
SouthWest	Sherborn	31.9%	1,339	30%
SouthWest	Medway	31.9%	3,965	44%
Three Rivers	Dover	31.6%	1,754	45%
Minuteman	Lincoln	30.7%	2,474	8%
Minuteman	Carlisle	30.6%	1,445	23%
Minuteman	Boxborough	30.5%	1,487	89%

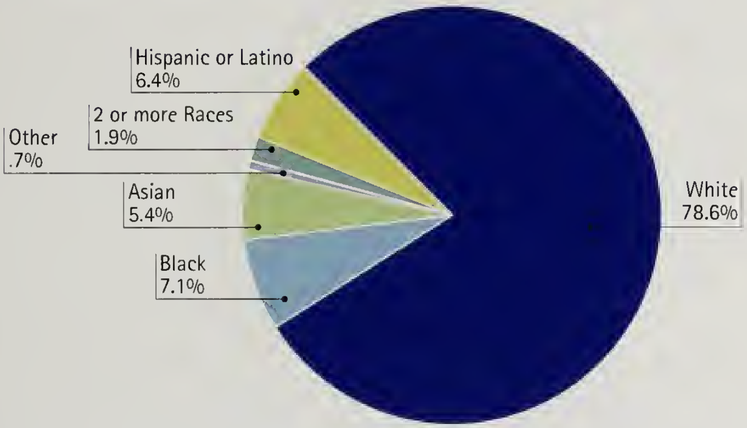
Source: U.S. Census Bureau

Table 1-11 lists the MAPC communities with the highest percentage of people under 18 years of age. Again we see that the towns with the fastest growing population of young people are located along the I-495 corridor; Boxborough, Hopkinton, and Southborough have seen the biggest rise.

RACE AND ETHNICITY[4]

The racial and ethnic composition of the region is continuously growing more diverse, in part because of foreign immigration. Minority populations represented 14.5% of the region's population in 1990 and 21.4% in 2000. In the state, the minority populations rose from 12.2% to 18.1%. The region outpaced the state in the rate of growth of the Hispanic and Asian populations, while the state had a higher percentage gain in African-Americans since 1990. Chart 1-5 illustrates the racial and ethnic distribution in the region in 2000.

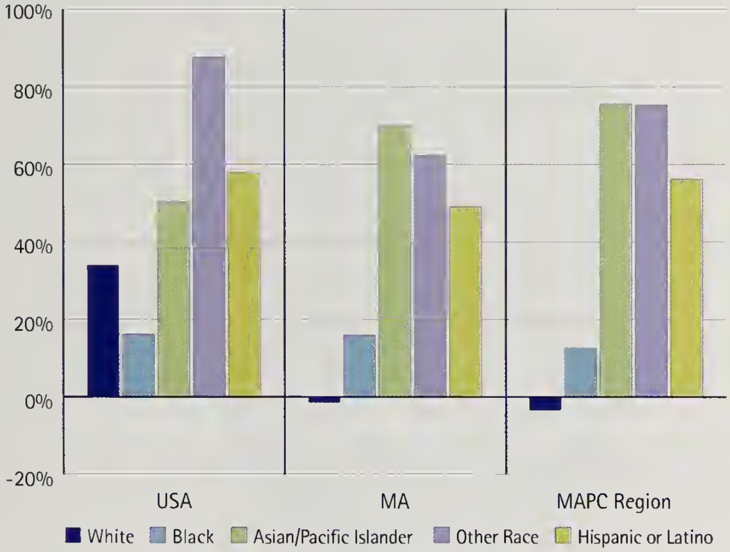
Chart 1-5: Racial Distribution of the MAPC Region, 2000



Source: U.S. Census Bureau

How has the region's racial composition shifted over time?[5]

Chart 1-6: Race and Ethnicity Trends in USA, MA, and MAPC Region, 1990-2000



Source: U.S. Census Bureau

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[4] Race and ethnicity have been combined for the purposes of analysis. Therefore, all categories represent non-Hispanic persons except the Hispanic or Latino category.

[5] While the 2000 Census allowed respondents to select 2 races or more, the 1990 Census did not. Persons who selected "2 or more races" on the 2000 Census questionnaire have been removed from our calculations for purposes of comparability between 1990 and 2000. Persons selecting "2 or more races" represent no more than 2.4% of the nation, state, or region's populations.

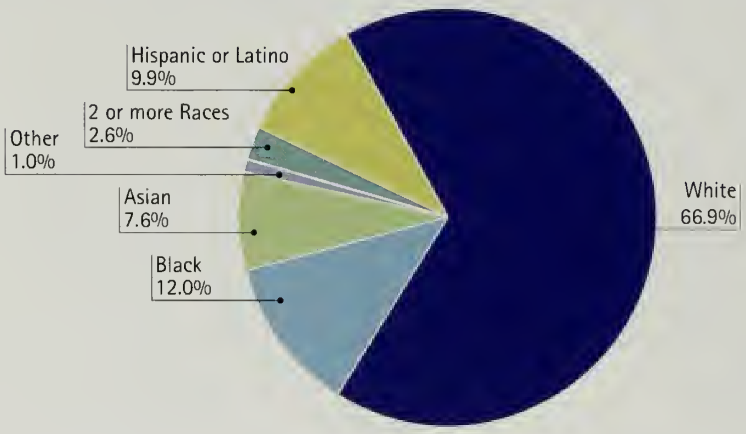
Chart 1-6 shows how the changes in racial distribution of the MAPC region compare with the state and the nation. The MAPC region experienced a greater percent loss of non-Hispanic Whites than the state. This loss was in absolute terms as well, as the region lost over 89,000 non-Hispanic White residents. The region experienced a larger percentage gain of Asians and persons of Hispanic origin than Massachusetts.

The Black population in the MAPC region did increase, but to a lesser extent than the increase experienced by the state.

How do subregions differ in racial and ethnic composition?

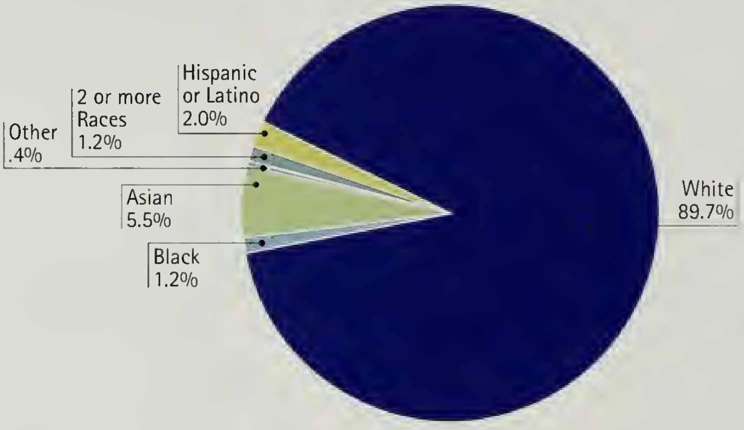
Charts 1-7 through 1-14 present the racial and ethnic distribution of each subregion.

Chart 1-7: Racial Distribution in the Inner Core Subregion, 2000



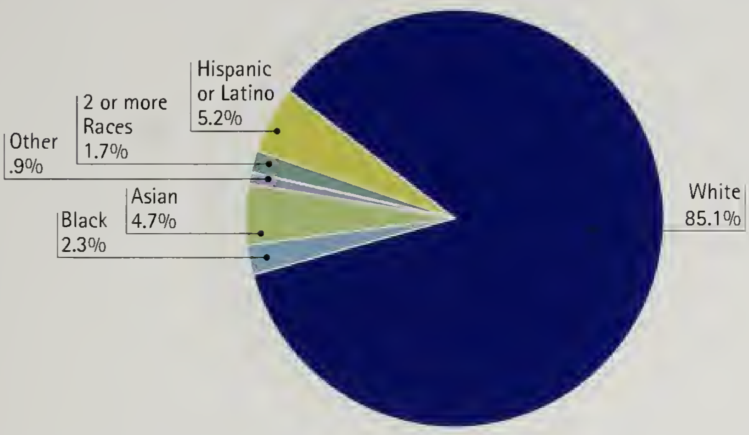
Source: U.S. Census Bureau

Chart 1-8: Racial Distribution in the Minuteman Subregion, 2000



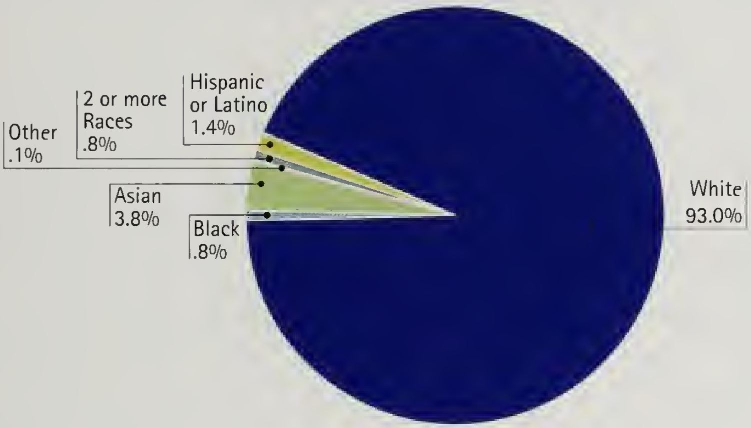
Source: U.S. Census Bureau

Chart 1-9: Racial Distribution in the Metrowest Subregion, 2000



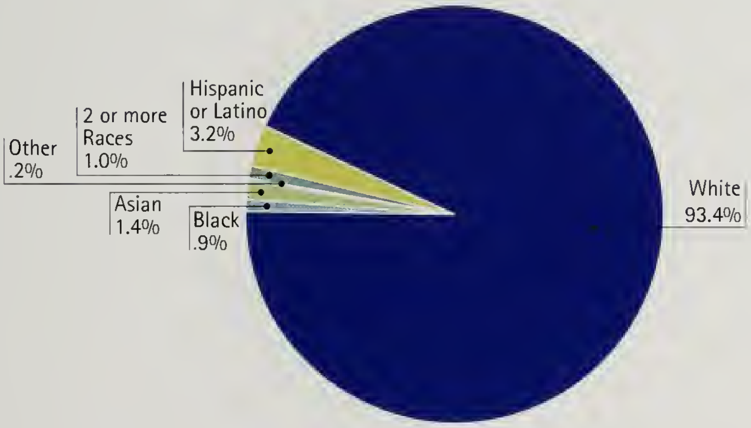
Source: U.S. Census Bureou

Chart 1-10: Racial Distribution in the North Suburban Subregion, 2000



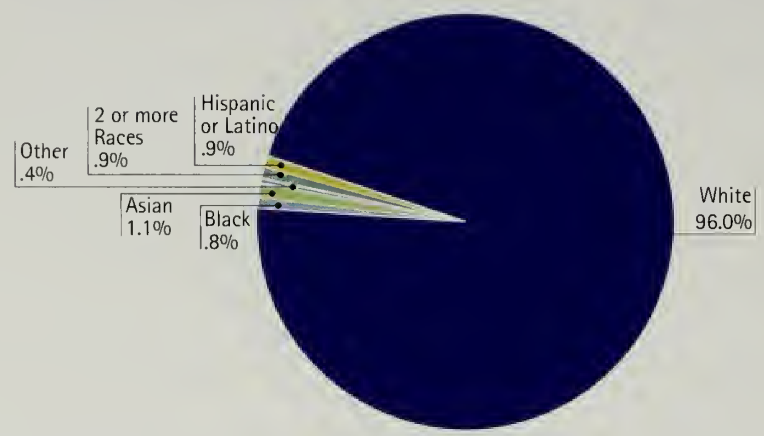
Source: U.S. Census Bureou

Chart 1-11: Racial Distribution in the North Shore Subregion, 2000



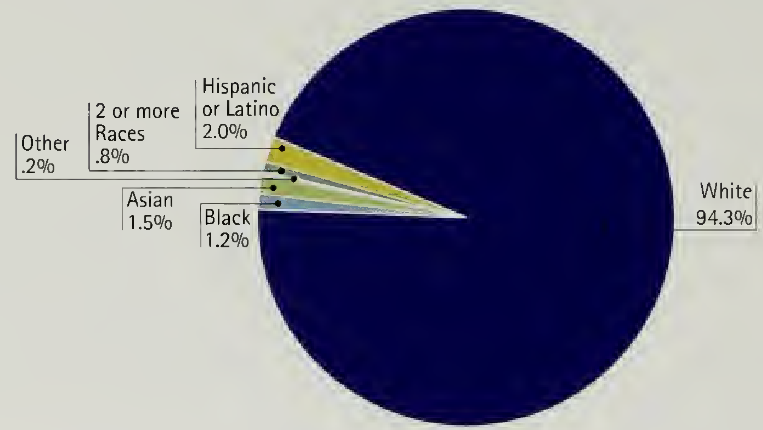
Source: U.S. Census Bureou

Chart 1-12: Racial Distribution in the South Shore Subregion, 2000



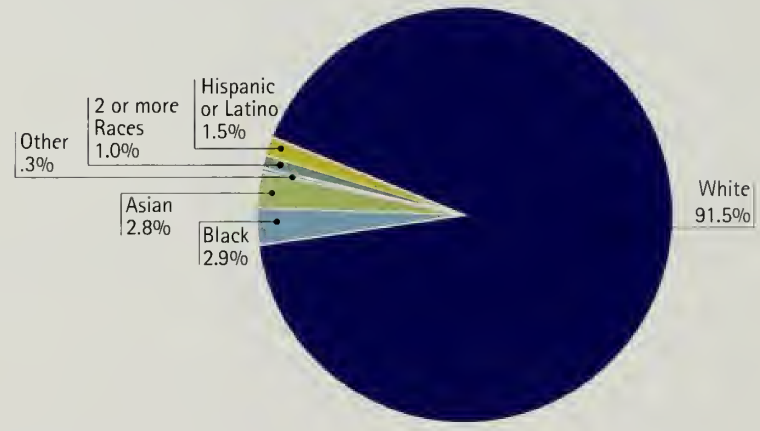
Source: U.S. Census Bureau

Chart 1-13: Racial Distribution in the Southwest Subregion, 2000



Source: U.S. Census Bureau

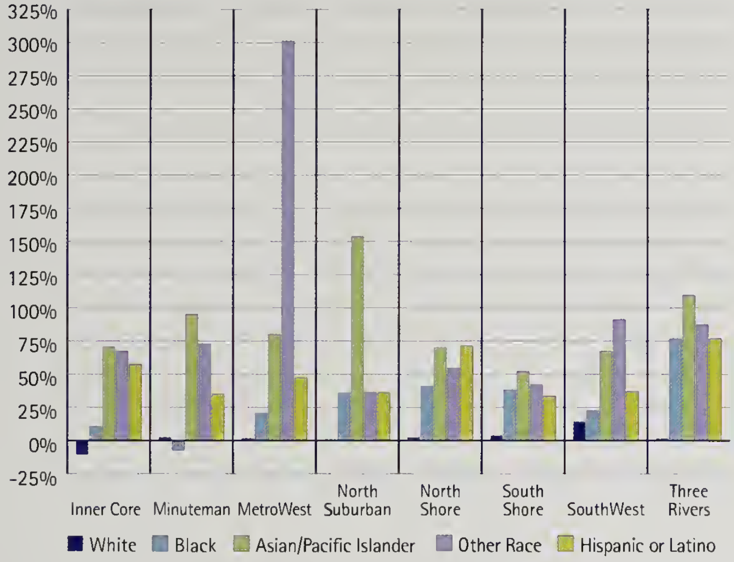
Chart 1-14: Racial Distribution in the Three Rivers Subregion, 2000



Source: U.S. Census Bureau

The Inner Core is by far the most racially diverse subregion; it is home to the highest concentrations of Blacks, Asians, and persons of Hispanic origin in the region. Conversely, the South Shore subregion has the lowest percentage of minorities and the highest percent of non-Hispanic White residents (96%).

Chart 1-15: Race and Ethnicity; Trends in MAPC Subregions, 1990-2000



Source: U.S. Census Bureou

According to Chart 1-15, the Inner Core's non-Hispanic White population declined over the decade (-10.6%). The SouthWest subregion's non-Hispanic White population grew the fastest, by 14.1%, while other subregions showed minimal increases. The Three Rivers subregion had the highest percent growth in persons of Hispanic origin (76.7%), primarily due to significant increases in Norwood and Canton. The Three Rivers subregion also led the subregions in percent increase in African-Americans, with high growth rates in Dedham, Canton, and Foxborough. The North Suburban subregion experienced the highest percent increase in the Asian community (153.4%), with particularly strong growth in Lynnfield, Wakefield, and Woburn.[6]

Where are minority populations most and least concentrated in the region?[7]

Map 1-5 illustrates the distribution of minority populations among the cities and towns in the MAPC region. Two MAPC communities, Chelsea and Boston, became "minority majority" cities since the last census, as the non-Hispanic White population totaled less than 50% of their populations. In Chelsea, the key factor has been a growing Hispanic population, which grew by 48.4% over the decade. Boston experienced significant growth among its Black population (23.8%) and its Hispanic population (14.4%). High growth in minority populations can partially be attributed to high levels of international immigration. Chelsea ranked 1st in percent population growth due to international immigration between 1990 and 1995, while Brookline ranked 2nd and Boston ranked 3rd. A total of 13 MAPC communities have a minority population of over 20%. All are located in the Inner Core with the exception of Framingham, which is in the MetroWest subregion. The North Shore and South Shore communities have the least minority representation, led by Manchester-by-the-Sea (1.7%), Essex (2.2%), Cohasset (2.2%), and Pembroke (2.4%).

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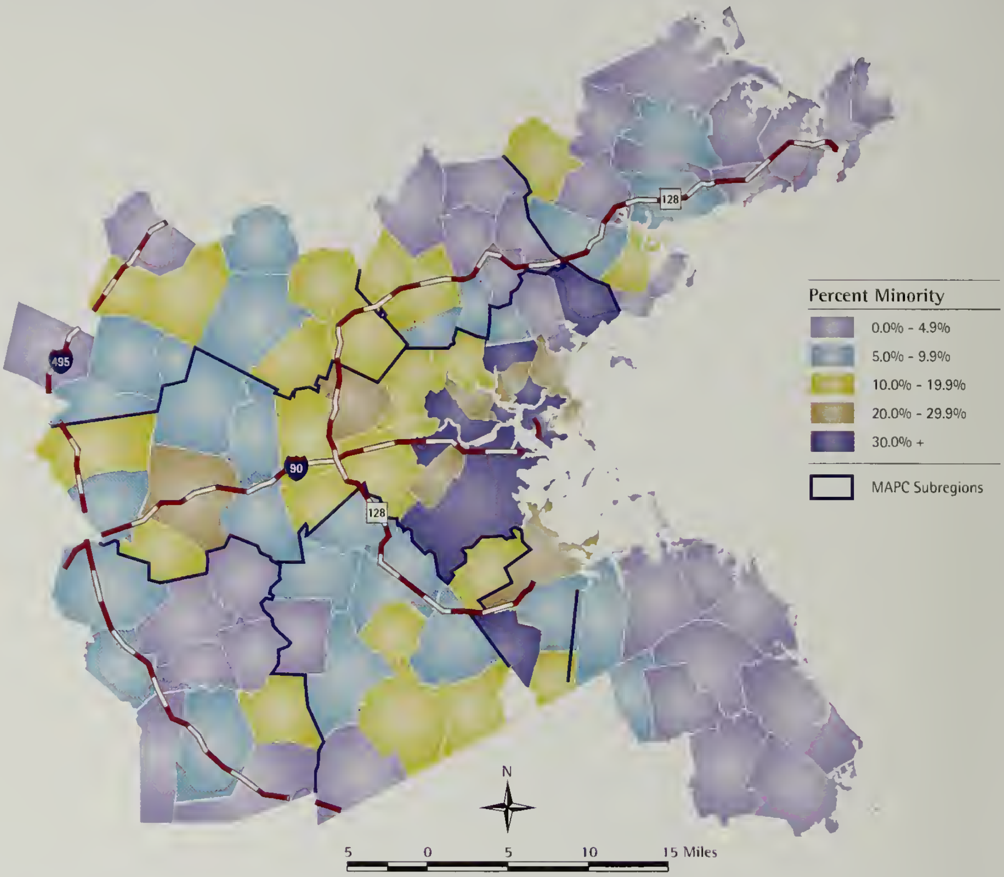
[6] MetroWest's growth in "other race, non-Hispanic" extends to 301% due to large increases in that category in every community except Sudbury. The scale only extends to 175% for presentation purposes.

[7] As noted earlier, the word "minority" is used to refer to all persons who are not "non-Hispanic White", in accordance with accepted terminology per the Office of Equal Employment Opportunities.

Map 1-5 Percent Minority and Two or More Races by Community, 2000



Source: U.S. Census Bureau

THE CHALLENGES AHEAD

Growth trends, especially the high growth along the periphery of the region, raise increased concern about sprawl and its impacts on traffic, water and other natural resources, infrastructure, local budgets, the environment, and the general "quality of life." Increases in the number of school-age children put pressure on local school systems and school budgets. At the same time, the decline in the number of young adults may signify a "brain drain," as people who have been educated in our world-class educational institutions leave to find job opportunities in more affordable parts of the country. Meanwhile, the increase in new immigrants contributes to the workforce of the future. The challenge is to retain and educate those born here while welcoming and accommodating newcomers.

Growth trends, especially the high growth along the periphery of the region, raise increased concern about sprawl and its impacts on traffic, water and other natural resources, infrastructure, local budgets, the environment, and the general "quality of life."

THE
LOTUS
DEVELOPMENT
BUILDING
55 CAMBRIDGE PARKWAY

SECTION TWO: EMPLOYMENT[8]

As the location of myriad high-technology, financial, medical, and higher education establishments, metro Boston has a diverse economic base, and this diversity contributes to the region's economic strength in good times and bad. This section provides an overview of how the MAPC region's economy has shifted throughout the 1990s, focusing on changes in employment sectors, total job growth, average wage, and unemployment.

The MAPC region experienced a 10.5% increase in total jobs between 1990 and 2000, with the majority occurring in the second part of the decade as the region emerged from the recession of the early 1990s. Job growth has consistently been strongest in the service sector, while manufacturing jobs have declined. The Inner Core continued to attract a majority of new corporations and businesses throughout the decade; however, job growth outside of Route 128 occurred at a faster rate. Indeed, job growth patterns have, by and large, gone hand-in-hand with population trends, as the most significant economic expansion of the decade occurred in fast-growing communities along the I-495 corridor.

The region continues to have relatively low unemployment. In 2000, regional unemployment was nearly half the rate of the nation (2.2% compared to 4.0%), despite plant closings and layoffs. Incomes tend to be highest just outside of Route 128, while communities with the highest wages are scattered throughout the region. The difference between the average wage of jobs in a municipality and the median income of residents of that municipality is quite large in many cases, indicating that many people may not work in the community where they reside.

As the region has maintained its status as a thriving economic center over the 1990s, the rate of job growth outpaced population growth, widening the gap between available jobs and the labor force needed to fill them. At the same time, the number of higher skill high-tech positions has grown, while that of lower skill manufacturing jobs has declined, contributing to a mismatch of job requirements and workforce skills. The high cost of living also puts pressure on the economy, as Boston continues to be one of the most expensive metropolitan areas in the nation.[9] High costs exert upward pressure on wages, potentially putting businesses at a competitive disadvantage and discouraging new businesses from locating in the region.

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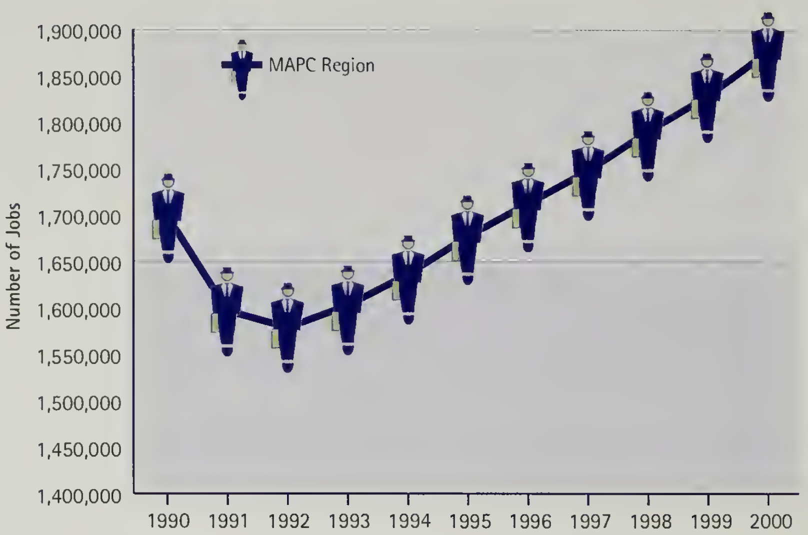
[8] The regional economy, which had been thriving throughout the mid- to late 1990s, began to slow in 2000, as many economists predicted a slowdown or recession ahead; the events of September 11, 2001 exacerbated that trend. Due to the evolving nature of these changes and the fact that they were occurring beyond the decade being studied, the Metro Data Center chose not to address the declining economy in this report.

[9] The Boston metropolitan area had a composite score of 136.2 by the ACCRA Cost of Living Index in the 3rd quarter of 1999, registering the fifth highest cost-of-living composite score in the United States.

JOB GROWTH

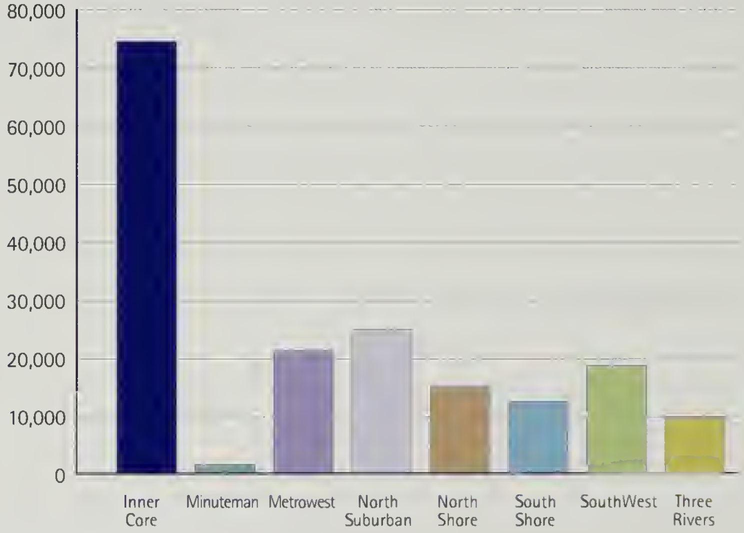
Chart 2-1 Employment in the MAPC Region, 1990-2000



Source: MA Department of Employment and Training

Chart 2-1 illustrates the regional trends in job growth over the decade. After a dramatic drop in employment that accompanied the recession of the early 1990s, the region recovered with steady growth throughout the remainder of the decade to total just over 1,876,000 jobs by 2000. A 1.3% loss in jobs between 1990 and 1995 was offset by an 11.9% increase between 1995 and 2000, which led to an overall 10.5% increase in jobs for the decade.

Chart 2-2: Net Job Gain in the MAPC Subregions, 1990-2000



Source: MA Department of Employment and Training

Chart 2-2 shows the change in the number of jobs by subregion from 1990 to 2000.[10] Over the decade, the region experienced a net gain of 177,553 jobs. The Inner Core, where the greatest number of new business establishments located over the decade, had a net gain of 74,436 jobs

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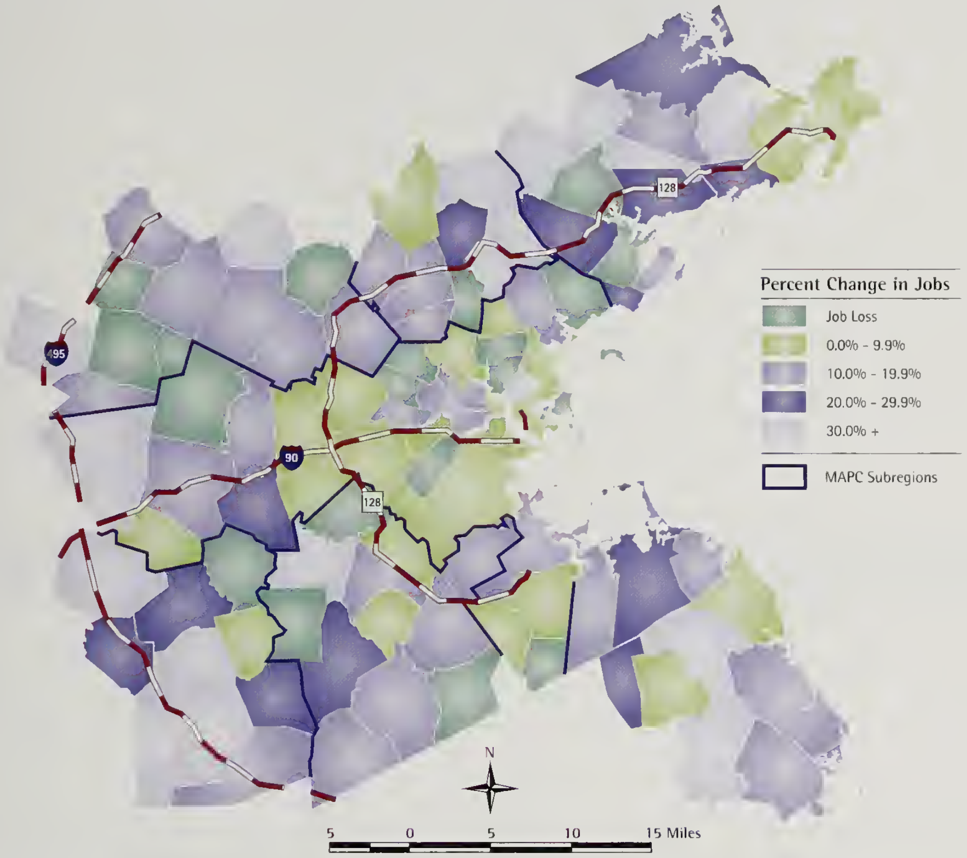
[10] Chart 2-2 shows the net change in jobs, which equals the total number of jobs gained minus the number of jobs lost.

(7.3%) over the decade, with heavy concentrations in three cities: Boston (+46,291), Cambridge (+12,347), and Quincy (+7,289). The North Suburban subregion ranked 2nd in employment gains, with 24,806 more jobs in 2000 than in 1990, a forth of which were in Burlington. The Minuteman subregion experienced the smallest gain, adding 1,611 net new jobs. A contributing factor to slow job growth was the closing of Digital Equipment Corporation, which was purchased by Compaq and had facilities in several Minuteman towns. In percentage terms, however, Minuteman towns such as Bolton and Carlisle showed high job growth, gaining 62% and 39% respectively.

Map 2-1: Percent Job Gain by Community, 1990 – 2000



Source: MA Department of Employment and Training

Map 2-1 illustrates the percentage of job growth in each MAPC community from 1990 to 2000. Most towns located along the I-495 corridor show modest to substantial job growth. The SouthWest led the subregions with the fastest job growth, primarily due to increased economic activity in Hopkinton, Franklin, and Bellingham, and largely in new developments near I-495 interchanges. The North Shore saw substantial economic growth as well, particularly in Middleton and Wenham where job growth approached 100%. Leaders in the South Shore were Norwell and Pembroke, with 54% and 38% job growth, respectively. In spite of significant job creation in Boston, Cambridge, and Quincy, the Inner Core saw net job losses totaling over 11,000 among ten communities. In addition, the Minuteman subregion lost over 8,000 jobs among five towns. Table 2-1 ranks the MAPC communities with the highest percent gains and losses in employment over the decade.

Table 2-1: Highest Percent of Jobs Gained and Lost; 1990 - 2000

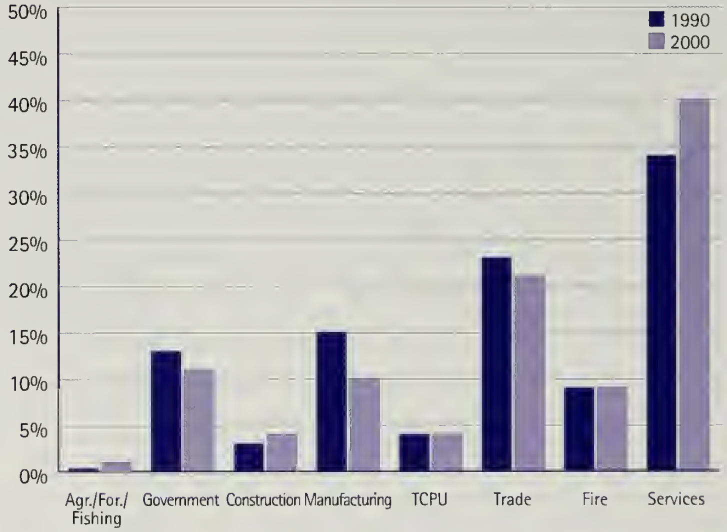
Subregion	City/Town	% Gained	# Gained	Subregion	City/Town	% Lost	# Lost
SouthWest	Franklin	121%	8,638	MetroWest	Sudbury	-33%	-3,215
North Shore	Middleton	98%	2,438	Minuteman	Maynard	-33%	-2,441
North Shore	Wenham	95%	626	Inner Core	Nahant	-26%	-129
North Suburban	N. Reading	83%	2,872	Minuteman	Bedford	-18%	-4,450
SouthWest	Bellingham	70%	2,079	Inner Core	Winthrop	-17%	-514
North Shore	Topsfield	63%	1,117	Inner Core	Lynn	-15%	-4,468
Minuteman	Bolton	62%	917	Inner Core	Everett	-14%	-1,679
South Shore	Norwell	54%	2,950	North Shore	Salem	-11%	-2,140
SouthWest	Hopkinton	53%	2,083	Inner Core	Brookline	-9%	-1,689
MetroWest	Southborough	53%	2,180	Inner Core	Holbrook	-8%	-253

Source: MA Department of Employment and Training

EMPLOYMENT BY SECTOR

The majority of new jobs added in the region during the 1990s were in the service industry, which saw an overall gain of 174,000 jobs. By 2000, service positions (see Chart 2-3) represented 40% of the total jobs in the region, up 6 percentage points from 1990. Services include professional services, business, repair, entertainment, recreation, health, and education. Conversely, the manufacturing industry suffered a net loss of more than 55,000 jobs, and government jobs had a net loss of over 1,000 positions. The loss in manufacturing jobs is cause for particular concern, as many workers previously employed in these jobs, which pay relatively well while demanding only limited skills, lack the specific training needed for jobs in other well-paid expanding industries. While the trade sector had an overall gain of nearly 13,000 jobs in the 1990s, it experienced a drop in percentage of total jobs in the region.

Chart 2-3: Percent Employment by Sector in the MAPC Region, 1990-2000

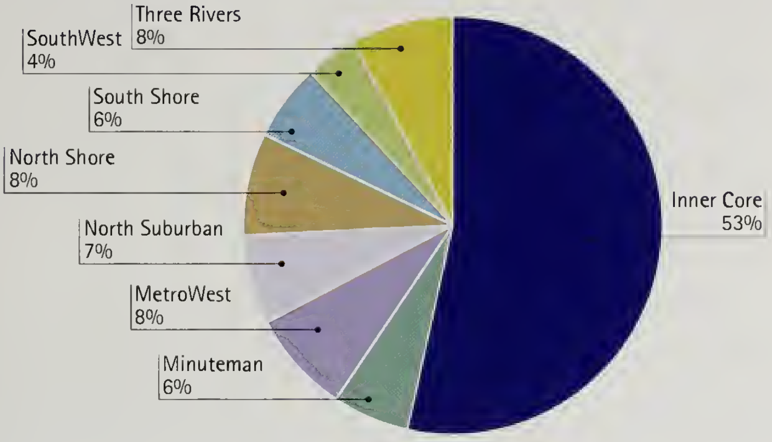


Source: MA Department of Employment and Training

NEW CORPORATIONS AND ESTABLISHMENTS

In developing strategies to strengthen the region's economy, it is important to understand where businesses are growing and declining throughout the region. Business creation at the local level has varied significantly by community during the past ten years. In 1999, almost 6,000 new for-profit corporations registered with the Department of Revenue (DOR).[11] Chart 2-4 shows the distribution of these new corporations by subregion.

Chart 2-4: Percent Share of New Corporations in the MAPC Region, 1999



Source: Department of Revenue, Division of Local Services Corporation Source Book

Over half of the new corporations were registered in the Inner Core subregion, with 1,271 in Boston alone. The others were distributed fairly evenly among the other subregions, with the exception of the SouthWest, which claimed only 4%.

Table 2-2: Business Establishments Gains and Losses, 1990 – 2000

Top Five Communities					Bottom Five Communities				
Ranked by Absolute Change									
	1990	2000	Numeric Change	Percent Change		1990	2000	Numeric Change	Percent Change
Boston	18,224	19,187	963	5.3%	Lynn	1,510	1,255	-255	-16.9%
Cambridge	3,587	4,008	421	11.7%	Brookline	1,690	1,591	-99	-5.9%
Marlborough	995	1,287	292	29.3%	Randolph	700	624	-76	-10.9%
Beverly	958	1,214	256	26.7%	Revere	773	702	-71	-9.2%
Natick	1,197	1,445	248	20.7%	Malden	1,125	1,055	-70	-6.2%
Ranked by Percent Change									
	1990	2000	Numeric Change	Percent Change		1990	2000	Numeric Change	Percent Change
Boxborough	104	160	56	53.8%	Lynn	1,510	1,255	-255	-16.9%
Wrentham	243	368	125	51.4%	Nahant	72	63	-9	-12.5%
Hopkinton	281	415	134	47.7%	Randolph	700	624	-76	-10.9%
Southborough	234	334	100	42.7%	Winthrop	302	272	-30	-9.9%
Middleton	207	286	79	38.2%	Revere	773	702	-71	-9.2%

Source: MA Department of Employment and Training

Table 2-2 lists the largest business gains and losses by community, presented in both numeric and percentage terms, between 1990 and 2000. It shows that larger cities added the highest number of new businesses, while smaller, growing communities, particularly along the I-495 corridor, experienced the highest rate of increase in new establishments. Losses in business establishments, in numeric and percentage terms, occurred to the greatest extent among older Inner Core cities and towns. Lynn in particular took the hardest hit, leading the region in both number and percentage of business establishments lost in the 1990s.

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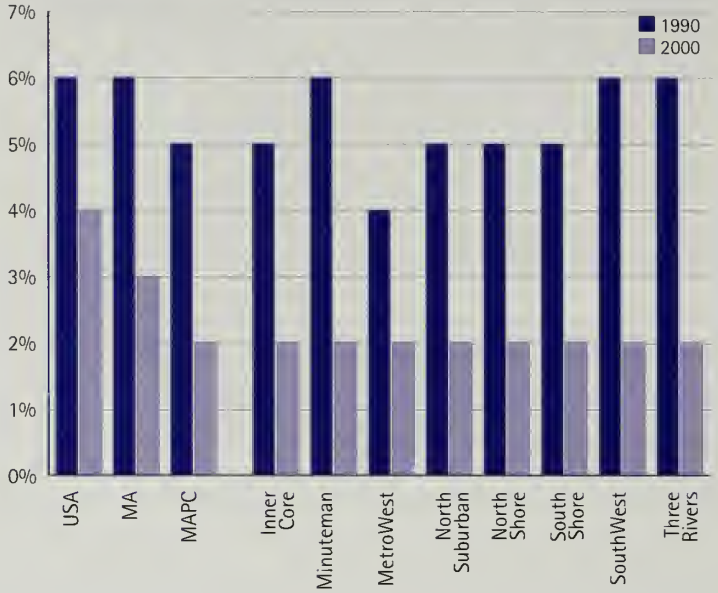
[11] Some corporations that register with the DOR may never actually come into being, and others may have headquarters in one town and operations in another, yet be registered in only the headquarters community. These data include only for-profit corporations.

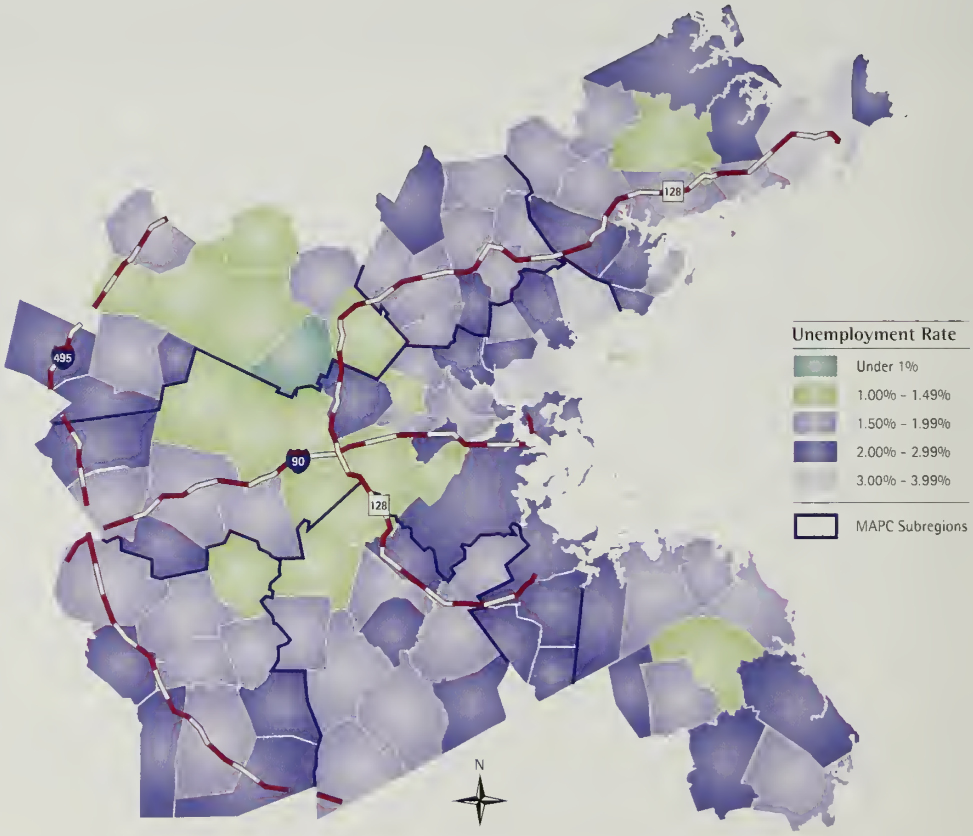
UNEMPLOYMENT

Chart 2-5: A Comparison of Unemployment Rates of MA, MAPC Region and Subregions, 1990-2000



Source: MA Department of Employment and Training

Map 2-2: Unemployment Rate by Community, 2000



Source: MA Department of Employment and Training

With an unemployment rate of 2.2%, the MAPC region in 2000 had a lower unemployment rate than Massachusetts (see Chart 2-5). The Inner Core had the highest unemployment of all the subregions (2.4%), while the Minuteman area had the lowest (1.5%). Although Minuteman lost jobs over the decade, unemployment also declined, most likely because many residents commute to other areas for job opportunities. Compared to the nation as a whole, unemployment rates in the region dropped dramatically during the decade.

Map 2-2 presents unemployment rates in the cities and towns in the region. Although unemployment figures vastly improved over the decade, a number of communities did not share in this overall prosperity. The unemployment rate in several communities remains high and reflects the urgent need for workforce development strategies that train unemployed workers for high-paying jobs. Communities with a higher unemployment rate than the regional average in 2000 are listed in Table 2-3.

Table 2-3: Communities with Unemployment Rates Above the MAPC Regional Average in 2000

Community	Unemployment Rate
MA	2.7
MAPC Region	2.2
National	4.0
Chelsea	3.9
Gloucester	3.8
Hull	3.4
Lynn	3.4
Revere	3.4
Everett	3.0
Boston	2.9
Rockland	2.9
Rockport	2.8
Holbrook	2.7
Quincy	2.6
Randolph	2.6
Stoughton	2.6
Malden	2.5
Milford	2.5
Salem	2.5
Wilmington	2.4
Bellingham	2.3
Dedham	2.3
Hudson	2.3
Saugus	2.3
Weymouth	2.3
Winthrop	2.3

Source: MA Department of Employment and Training

In 2000, Chelsea led the MAPC communities in highest unemployment with a rate of 3.9%. This is significantly higher than the regional unemployment rate of 2.2. In all, 23 of the region's 101 communities had a higher unemployment rate than the region as a whole, and most are located in the Inner Core.

How many jobs have been lost to layoffs and plant closings?

The Commonwealth of Massachusetts reports plant closings and/or permanent layoffs as required by the Worker Adjustment and Retraining Notification Act. Table 2-4 summarizes the total jobs lost due to plant closings or permanent layoffs in the region from 1993 to 2001.

Table 2-4: Jobs Lost Due to Plant closings or Permanent Layoffs MAPC Region 1993 – 2000

Year	Total Layoffs	Manufacturing Jobs	Percent of Lakes
1993	12,125	6,644	55%
1994	10,007	4,720	47%
1995	9,156	2,971	32%
1996	9,062	4,148	46%
1997	14,927	7,270	49%
1998	15,966	9,824	62%
Total	*71,243*	*35,577*	*50%*
1999	15,542	NA	NA
2000	15,410	NA	NA
2001*	10,422	NA	NA
Total	*112,617*	*NA*	*NA*

Source: Commonwealth of Massachusetts, Worker Adjustment and Retraining Notification Act
NA = Not Available

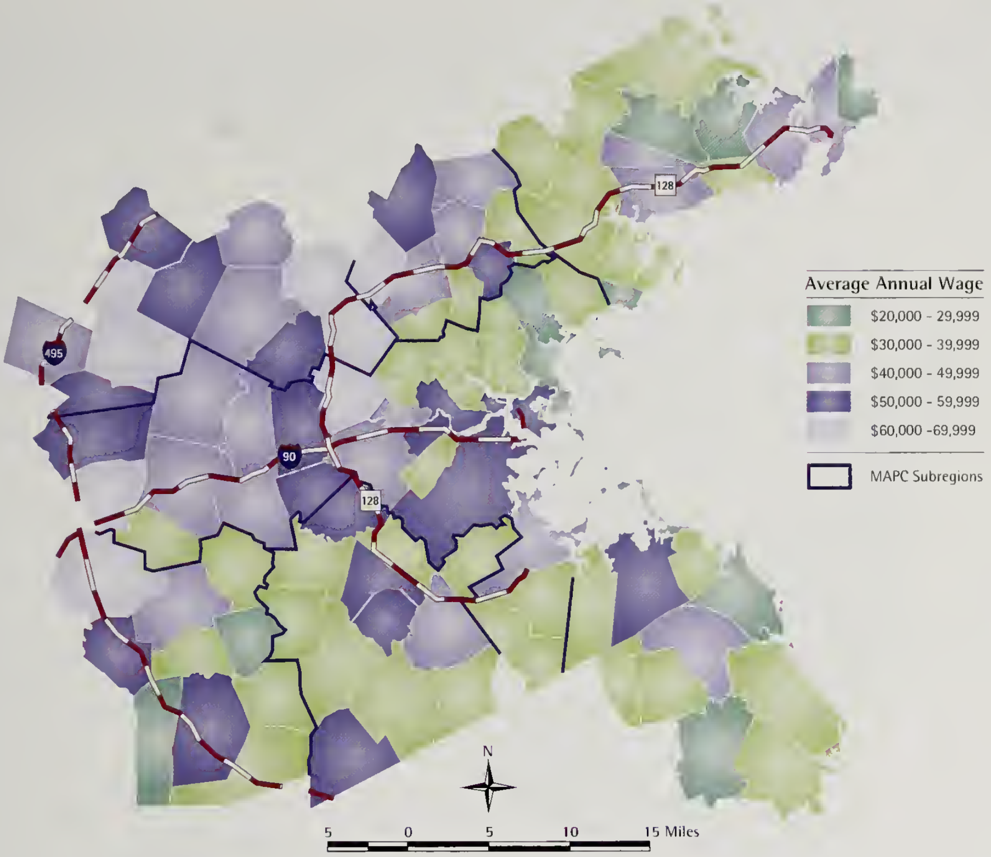
Between 1993 and 1998, the MAPC region lost 71,243 jobs due to plant closings or permanent layoffs. Of the jobs lost, 35,577 or 50% were in the manufacturing sector. This is significant because the manufacturing sector provides higher-wage employment for semi- or low-skilled workers in the workforce. During the eight and a half years of reporting, 102,195 jobs were lost in the region due to plant closings or permanent layoffs.

WAGES

Job gains and low unemployment are positive indicators of a healthy economy but do not present a complete picture. Jobs in the food service and retail sectors, for example, pay relatively low or minimum wages, and workers in those jobs may face financial burdens. Wage data help to complete the picture by providing a general idea of how industries and businesses in a community pay their workers. Wage data are based on where jobs are located ("place of employment"), whereas income data are based on where people live ("place of residence"); furthermore, median household income data include the incomes of all wage-earners in a household. For these reasons, there may be a significant gap between the average annual wage of jobs in a community and the median income of its resident households. Milton residents, for example, had a median household income of $76,430 in 1997, but Milton employers paid an average annual wage of only $28,587. This suggests that many of Milton's working age population may have commuted to high-paying jobs in other communities or may be in households with multiple wage-earners. Map 2-3 shows annual average wages for 2000 by community.

In developing strategies to strengthen the region's economy, it is important to understand where businesses are growing and declining throughout the region.

Map 2-3: Annual Average Wage by Community, 2000



Source: MA Department of Employment and Training

The average annual wage in Massachusetts was $44,301 in 2000, and in the City of Boston it was $57,749. A third of the communities in the region exceeded the state average, 42 communities had an average annual wage between $30,000 and $39,999, and 13 communities had an average wage of under $30,000. Waltham had the highest average annual wage at $68,801, and Rockport had the lowest at $23,036. The communities with the highest and lowest average annual wages are listed in Table 2-5.

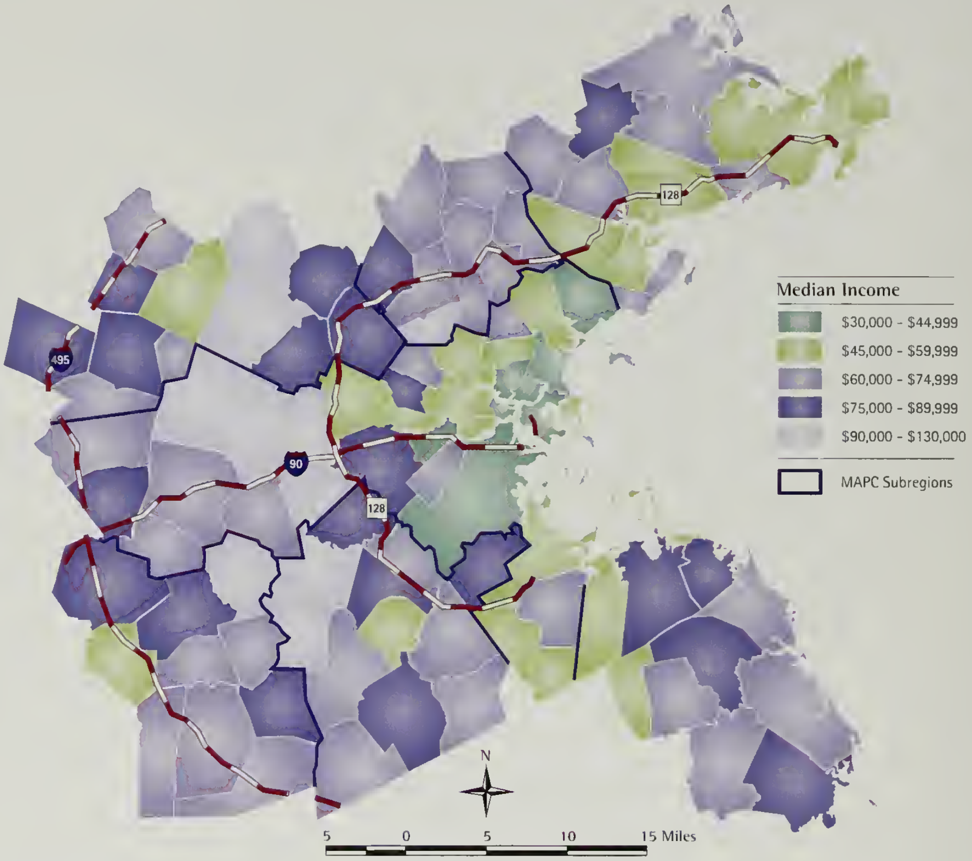
Table 2-5: Highest and Lowest Annual Average Wage, 2000

HIGHEST ANNUAL AVERAGE WAGE, 2000			LOWEST ANNUAL AVERAGE WAGE, 2000		
Subregion	**City/Town**	**Annual Avg. Wage**	**Subregion**	**City/Town**	**Annual Avg. Wage**
Inner Core	Waltham	$68,801	North Shore	Rockport	$23,036
SouthWest	Hopkinton	$68,626	Inner Core	Saugus	$23,764
Minuteman	Lexington	$68,192	Inner Core	Nahant	$24,282
Minuteman	Bedford	$65,647	SouthWest	Bellingham	$24,698
Minuteman	Boxborough	$64,067	South Shore	Hull	$25,998
Minuteman	Stow	$63,287	Inner Core	Revere	$27,212
North Suburban	Burlington	$62,508	South Shore	Scituate	$28,038
MetroWest	Southborough	$62,359	SouthWest	Millis	$28,128
Minuteman	Maynard	$61,963	North Shore	Swampscott	$28,315
Inner Core	Cambridge	$58,781	Inner Core	Winthrop	$28,528

Source: MA Department of Employment and Training

INCOME

Map 2-4: Median Income by Community, 1997



Source: Applied Geographic Solutions

The western part of the region has a concentration of communities with high median incomes (see Map 2-4). Of the ten communities with median incomes over $90,000, nine are located west of Route 128. Dover, Weston, and Sherborn are estimated to have the highest median incomes in the region, all above $120,000. Conversely, the 15 communities with the lowest estimated median incomes are located primarily in the Inner Core, with a few in the North Shore (Salem, Gloucester, and Rockport).

Table 2-6 compares income to other economic factors for the areas with the highest 1997 incomes. The rankings to the left of each variable illustrate the position from highest to lowest among the 101 MAPC cities and towns.

Interestingly, towns estimated to have the highest incomes are not among the highest in terms of average annual wages paid. They do, however, exhibit comparatively low unemployment rates. High-income areas in the region tend to be primarily residential, with low industrial and commercial use. Therefore, residents from these areas tend to commute to high-paying jobs in other communities. The reverse is also true. People with high-wage jobs tend to commute from other communities in the region and beyond. This is particularly true in the Inner Core and can be seen by comparing wages to income in Map 2-3 and Map 2-4.

Table 2-6: Top 10 Communities with the Highest Median Income Compared to Select Economic Variables, 1997

Subregion	City/Town	Rank	1997 Median Household Income	Rank	Percent Net Gain in Jobs 1990–97	Rank	1997 Average Annual Wage	Rank	1997 Unemplymt Rate
Three Rivers	Dover	1	$127,023	21	9.5%	86	$27,229	96	1.7%
MetroWest	Weston	2	$124,443	48	4.4%	11	$45,327	99	1.4%
SouthWest	Sherborn	3	$120,719	43	4.6%	83	$27,937	94	1.8%
MetroWest	Wellesley	4	$115,154	69	2.4%	15	$44,850	100	1.4%
Minuteman	Carlisle	5	$112,206	28	7.9%	32	$36,646	98	1.5%
MetroWest	Sudbury	6	$106,831	33	7.1%	25	$39,961	91	1.9%
MetroWest	Wayland	7	$101,169	60	3.2%	68	$30,336	95	1.8%
North Suburban	Winchester	8	$96,074	70	2.2%	63	$30,798	71	2.4%
Minuteman	Concord	9	$95,179	31	7.6%	23	$40,117	97	1.7%
Three Rivers	Medfield	10	$95,099	18	10.4%	33	$36,505	83	2.1%

Source: Applied Geographic Solutions; MA Department of Employment and Training

THE CHALLENGES AHEAD

Job growth patterns, like population growth patterns, give rise to concerns about sprawl. In a region where livability is an economic imperative, it is an increasing challenge to balance economic competitiveness and preservation of "community character." Other challenges include educating workers for new, high-skill jobs, devising creative solutions to retain young adults, and providing housing that is affordable to a range of workers and is located near jobs.

Photo: Kit Pyne, Department of Neighborhood Developmen

SECTION THREE: HOUSING

Housing is a key component of the region's resource base. Housing availability and affordability affect the region's economy and its ability to attract and retain a talented workforce. The location of housing and its proximity to jobs and transportation opportunities affect regional mobility and the natural environment. Data regarding an area's housing patterns also provide insight into a community's character. A high percentage of rental units, for example, may indicate opportunities for students, newcomers, or young families.

Photo: Kit Pyne, Dept. of Neighborhood Development

A high percentage of homeownership may signify more stability, higher prices, or less diversity. This section analyzes housing in the MAPC region based on new construction, growth in housing units, vacancies, tenure, number and prices of housing unit sales, and owner and renter affordability.

The region's housing market saw many changes over the decade. The distribution of building permits issued for new housing construction shows an increase in sprawl-type development. New single-family housing increased throughout the 1990s, outstripping new multi-family housing by a factor of 4 to 1. Moreover, 20 communities, most outside of the Inner Core, did not issue any multi-family permits from 1990 to 2000. As the decade came to a close, however, single-family home construction declined slightly while the number of multi-family units was rising. The bulk of new multi-family construction has consistently occurred inside the Inner Core subregion.

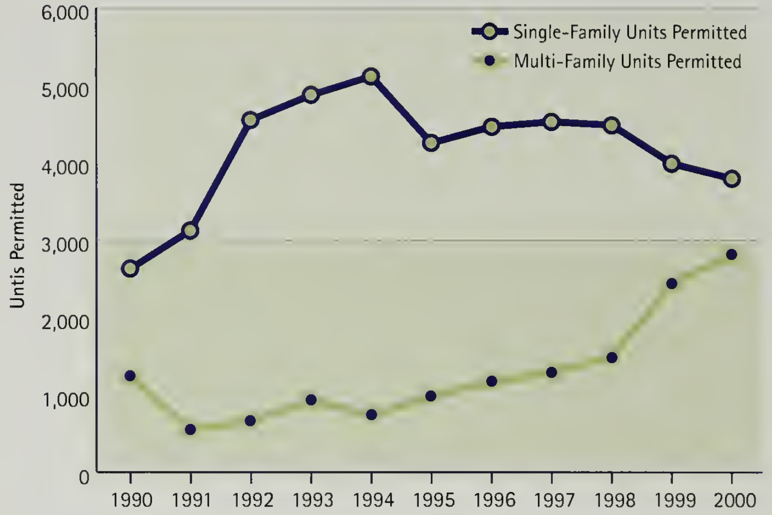
The strain on available housing has intensified throughout the decade, as household size and vacancy rates declined, both at a faster rate than in the nation. Moreover, homeownership has increased at nearly four times the rate of renter-occupied housing, contributing to an enormous availability and affordability squeeze on the rental market. Some Inner Core and urban communities with a significant renter-occupied housing stock saw growth in rentals, while many suburban communities with little rental stock saw declines. Increasing homeownership was accompanied by a 56% increase in sales from 1990 to 2000, despite dips that occurred during economic downturns. Home sale prices escalated particularly in the second half of the decade, contributing to widening the affordability gap between median incomes and home prices. As a result, the metropolitan area's housing costs are among the highest in the nation, and families with low, moderate, and even middle incomes are increasingly finding that they are being "priced out."

A number of serious issues face the region in terms of housing, including affordability, availability, location, proximity of jobs and housing, diversity of housing mix, fiscal concerns, and the balance of housing and other land uses. It is important that these be addressed both locally and regionally within a broader planning framework.

BUILDING PERMITS[12]

New construction requires a building permit. Permits distinguish between single-family and multi-family, the latter defined as housing with two or more units. The data below compare the number of single-family units permitted and the number of units permitted in multi-family structures or complexes.

Chart 3-1: Trends in Single and Multi-Family Units Permitted in the MAPC Region, 1990 – 2000



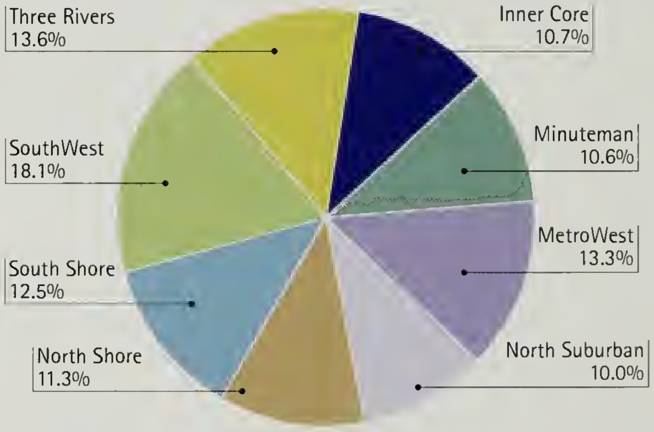
Source: U.S. Census Bureou

**Multi-Fomily Units refer to ony single unit in o structure thot houses two fomilies or more.*

Approximately four new single-family units were permitted for each multi-family unit throughout the decade. Chart 3-1 shows that at the beginning of the decade the difference was about 1,000 units. This gap widened throughout the decade and narrowed again by 2000. Therefore, although the decade began with a rise in single-family construction and decline in multi-family construction, this trend began to reverse by the end of the decade. The rise of multi-family developments in 1999 was primarily due to over 1,000 units for which permits were issued in Boston. The subsequent rise in 2000 involved a significant number of units permitted in Cambridge, Middleton, Salem, Peabody, and Marlborough.

Which subregions saw the most single- and multi-family housing construction?

Chart 3-2: Distribution of Single –Family Units Permitted, MAPC Region, 1990-2000



Source: U.S. Census Bureau, Division of Monufocturing ond Construction

**Doto is imputed by the Census Bureou for months thot ore unreported to them by the permit issued. It is likely thot o smoll percentoge of buildings permitted were never built.*

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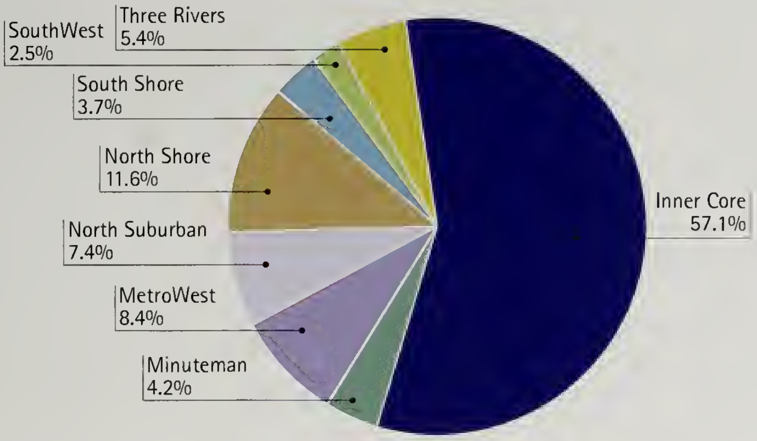
[12] Not all units permitted are actually built; thus the number of units permitted may exceed the number constructed.

Chart 3-3: Distribution of Multi -Family Units Permitted, MAPC Region, 1990-2000



Source: U.S. Census Bureau, Division of Manufacturing and Construction
**Data is imputed by the Census Bureau for months that are unreported to them by the permit issued. It is likely that a small percentage of buildings permitted were never built.*

Chart 3-2 and 3-3 demonstrate the distribution of single- and multi-family housing construction throughout the region. Single-family permits are distributed somewhat evenly throughout all of the subregions. The SouthWest subregion had the highest share of the single-family permits, claiming over 18%, while the Inner Core and the Minuteman subregions claimed the smallest shares. This is significant considering that the SouthWest subregion contains a mere 5% of the region's population, while the Inner Core contains 53%. New multi-family developments were concentrated primarily in the Inner Core, however, where 59.7% of all multi-family units were permitted in the 1990s. Just over half of all multi-family units permitted between 1990 and 2000 in the region were split among 5 cities: Boston, Waltham, Quincy, Woburn, and Braintree.

Table 3-1: Highest and Lowest Number of Single-Family Units Permitted, 1990 – 2000

Subregion	District	# Units Permitted	Subregion	District	# Units Permitted
SouthWest	Franklin	2,844	Inner Core	Nahant	16
SouthWest	Hopkinton	1,295	Inner Core	Winthrop	16
North Suburban	Wilmington	1,259	Inner Core	Chelsea	24
MetroWest	Marlborough	1,188	Inner Core	Belmont	30
South Shore	Marshfield	1,046	Inner Core	Everett	30
Three Rivers	Walpole	1,043	Inner Core	Watertown	39
Minuteman	Acton	976	Inner Core	Medford	59
South Shore	Pembroke	862	Inner Core	Cambridge	78
Three Rivers	Foxborough	848	Inner Core	Melrose	78
MetroWest	Natick	846	North Shore	Manchester	90

Source: U.S. Census Bureau, Division of Manufacturing and Construction

Tables 3-1 and 3-2 illustrate which cities and towns in the region had the highest and lowest numbers of single- and multi-family units permitted. Franklin led in single-family permits issued over the 10-year period with 2,844 permits. This is nearly 4 times the number of single-family permits issued in Boston over the same time period. Conversely, Boston had 52 times the number of multi-family units permitted in Franklin. Note that 20 towns did not issue any multi-family building permits throughout the 1990s. Building permit data in the region demonstrate one of the primary symptoms of sprawl: limited multi-family development occurring primarily in urban areas and growing single-family construction outside urban centers.

Table 3-2: Highest and Lowest Number of Multi-Family Units Permitted, 1990 - 2000

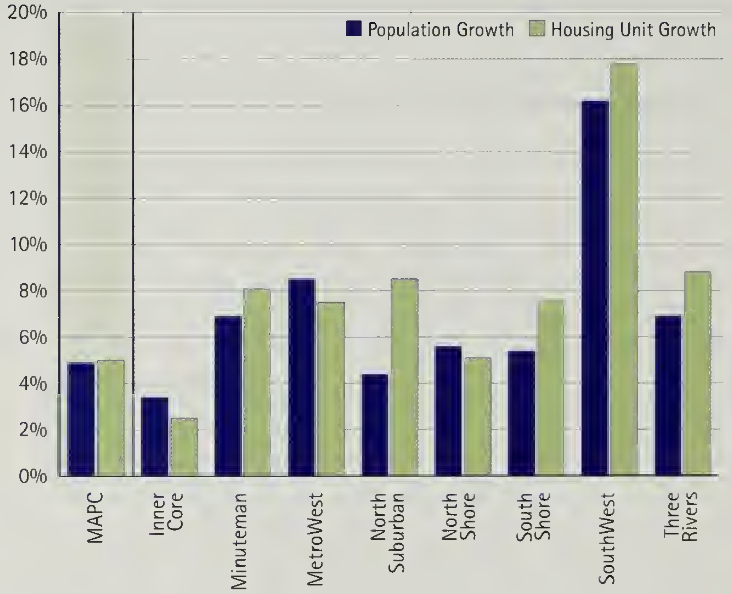
			(ZERO MULTI-FAMILY UNITS PERMITTED)			
Subregion	**Community**	**# Units Permitted**	**Subregion**	**Community**	**Subregion**	**Community**
Inner Core	Boston	3,410	Minuteman	Bolton	SouthWest	Millis
Inner Core	Quincy	1,099	North Suburban	Burlington	Inner Core	Nahant
Inner Core	Waltham	948	South Shore	Cohasset	SouthWest	Norfolk
North Suburban	Woburn	728	Three Rivers	Dover	North Suburban	North Reading
Inner Core	Cambridge	575	North Shore	Hamilton	South Shore	Norwell
Inner Core	Braintree	501	South Shore	Hanover	Inner Core	Randolph
MetroWest	Marlborough	494	South Shore	Hingham	Three Rivers	Walpole
North Shore	Peabody	439	Inner Core	Holbrook	Three Rivers	Westwood
Inner Core	Newton	416	SouthWest	Holliston	North Suburban	Wilmington
Three Rivers	Canton	408	Minuteman	Littleton	SouthWest	Wrentham

Source: U.S. Census Bureau, Division of Monufocturing ond Construction

HOUSING UNIT GROWTH

Population growth and increases in housing units generally go hand in hand. During the 1990s, this was true at the national, state, and regional levels: the number of housing units increased by 13.3% nationwide, by 6% in Massachusetts, and by 5% in the MAPC region; these percentages are almost identical to the growth rate for each respective population. This parallel movement does not always hold true, however, particularly when looking at smaller geographic areas. In some cases, for example, population growth is due to larger, rather than more households, and therefore is not accompanied by a need for more units. This is the case in Chelsea and Boxborough, two communities that went against the regional trend by showing significant increases in household size since 1990. Although both experienced an increase in housing over the decade, it was minimal in comparison to their population growth.

Chart 3-4: A Comparison of Population Growth by Housing Unit Growth: MAPC Subregions, 1990-2000



Source: U.S. Census Bureau

Population growth and increases in housing units generally go hand in hand.

Chart 3-4 shows that overall, housing growth in the MAPC region kept pace with population growth. A closer look at the individual subregions reveals disparities, however. The Inner Core, MetroWest, and North Shore subregions' populations grew at a faster pace than their housing units. Communities where this occurred are Chelsea, Lynn, Everett, Revere, Southborough, Sudbury, Framingham, Middleton, and Hamilton. In most cases, this is attributable to an increase in average household size between 1990 and 2000 and therefore does not translate into housing demand. In the other five subregions, the pace of housing unit growth actually exceeded population growth, generally indicating a decrease in household size. This is most pronounced in the North Suburban subregion, where the housing unit growth more than doubled the pace of the population growth.

Table 3-3: Cities and Towns with the Fastest Growing Housing Unit Count, 1990 – 2000

Subregion	City/Town	Increase in Units 1990-2000	Percent Growth in New Units	Percent Population Growth
SouthWest	Hopkinton	1,243	37.6%	45.2%
Minuteman	Bolton	379	34.5%	32.4%
SouthWest	Franklin	2,635	34.3%	33.8%
Minuteman	Boxborough	421	28.4%	45.6%
MetroWest	Southborough	636	26.9%	32.5%
North Suburban	Wilmington	1,492	26.3%	21.0%
SouthWest	Medway	858	25.3%	25.3%
North Shore	Middleton	440	23.1%	57.4%
South Shore	Pembroke	1,016	20.8%	16.4%
Three Rivers	Canton	1,374	20.2%	12.1%

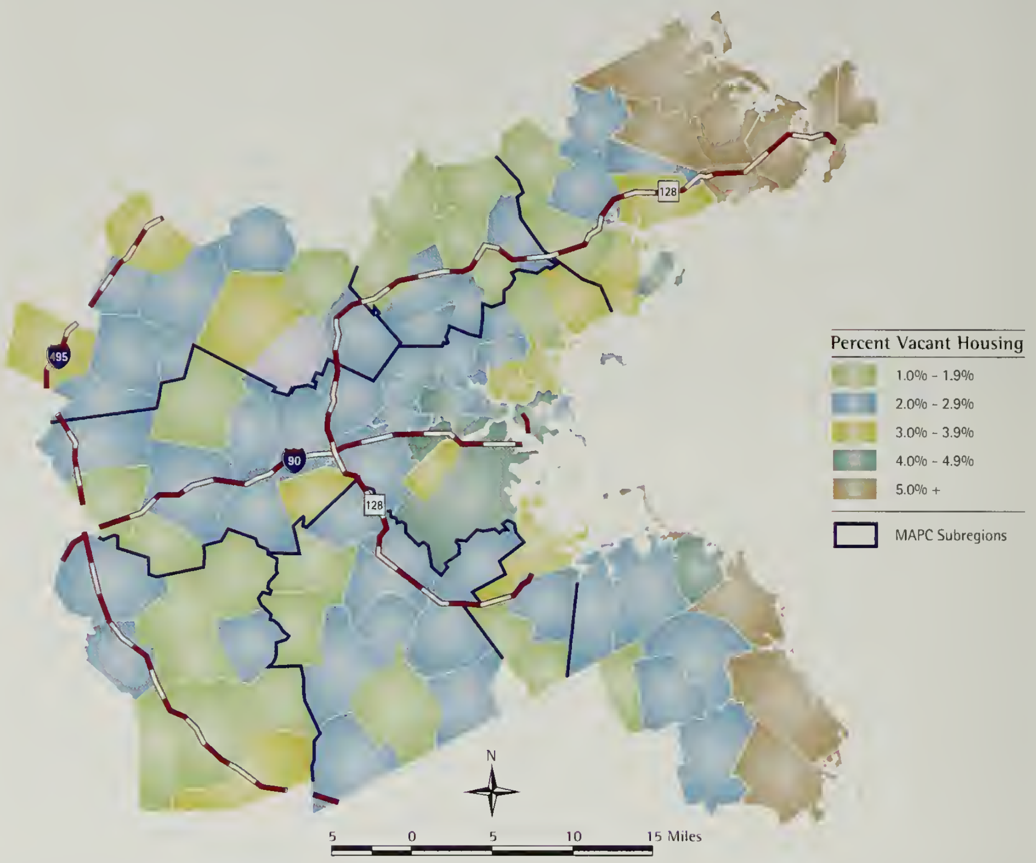
Source: U.S. Census Bureau

Table 3-3 ranks the communities with the fastest growing housing unit count. It illustrates that the areas with the fastest increase in housing generally correlate with those that have a rapidly growing population.

VACANCY RATES

In the MAPC region, 3.5% of all housing units were vacant in 2000. This vacancy rate is half the state figure and a third of the national rate. Moreover, vacancies in the region decreased at a faster rate than in the state or the nation, dropping 38% between 1990 and 2000.

Map 3-1: Housing Vacancy Rate by Community, 2000



Source: U.S. Census Bureau

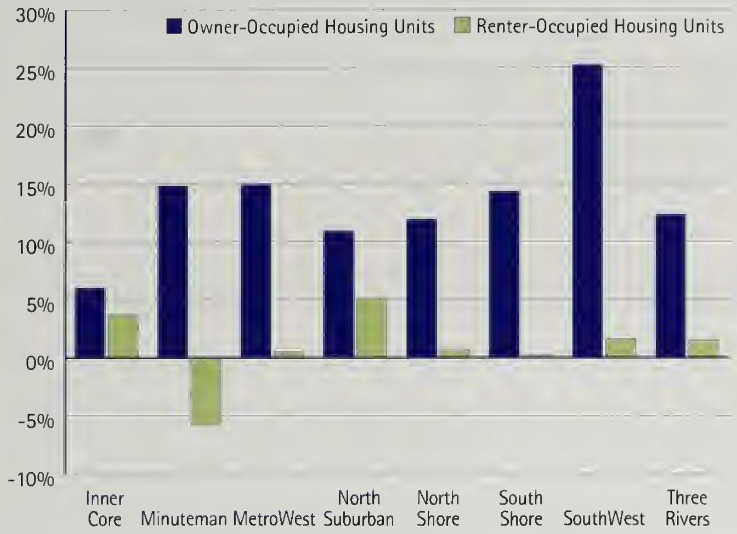
Towns with high vacancies tend to be concentrated by the ocean, as shown in Map 3-1. Since vacant homes include seasonal and recreational homes, it is likely that the majority of these units are vacation homes that were not being used at the time of the census. Six towns had vacancy rates that exceeded 9% of their housing units: Rockport, Hull, Scituate, Marshfield, Gloucester, and Essex. These communities rank as the top six for seasonal, recreational, and occasional use dwellings.

TENURE

Owner-occupied units represent 57.5% of the housing units in the region. Dover has the highest percent of owner-occupied units (95%), followed by Lynnfield (94%), Carlisle (94%), Bolton (93%), and Sherborn (93%). Renter-occupied units represent the remaining 42.5% of the region's housing units and are most commonly found in the Inner Core. Communities with the highest percentage of renter-occupied units are Chelsea (71%), Somerville (69%), Boston (68%), Cambridge (68%), and Everett (59%).

Chart 3-5 presents the percent change in owner- and renter-occupied units in each subregion over the decade. While most of the subregions show minimal increases in rental units, the Minuteman area actually lost over 700 rental units (5.8%) between 1990 and 2000. Over half of the region's cities and towns experienced an actual decrease in the number of rental units, while owner-occupied units increased in all 101 communities. Overall, the region's owner-occupied units increased at a much faster pace than rental units (11.6% compared to 2.9% respectively), contributing to the pressure on the region's rental stock. The loss of rental units has resulted largely from market forces, which have led to large-scale condo conversion. Demolition or rehabilitation and upgrading of

Chart 3-5: Percent Change in Housing Tenure, MAPC Subregions, 1990 to 2000



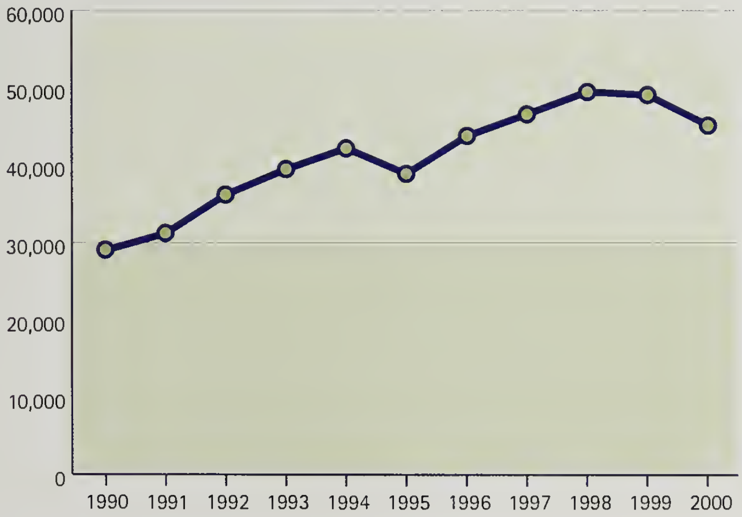
Source: U.S. Census Bureou

older properties made room for or were converted to owner units. Moreover, the end of rent control and expiring use restrictions have contributed to the declining rental stock.

In general, however, communities with a high number of renter-occupied units in 1990 gained rental units as the decade progressed, while communities with few rental units lost them. Nine communities – Boston, Brookline, Cambridge, Framingham, Lynn, Malden, Quincy, Somerville, and Waltham – each had more than 10,000 renter-occupied units in 1990, and all nine had gained rentals by 2000. Conversely, 37 communities, most of them outside Rt. 128 and along I-495, had fewer than 1,000 renter-occupied units in 1990; 25 of these, or 68%, lost rental units in the 1990s. Thus rental opportunities generally grew in the Inner Core and urbanized areas but declined in the suburbs, contributing to a spatial or geographic rental availability gap which most likely translates into an increased income or housing affordability gap.

HOME SALES

Chart 3-6: Number of Housing Sales in the MAPC Region, 1990-2000



Source: The Worren Group

The number of housing sales in the region followed the same general trend as single-family permitting from 1990 to 2000. Sales rose at the beginning of the decade, dipped in 1994, and then recovered throughout the rest of the decade until they dipped again in 2000. The dip in permits and sales in 1994 is a result of a housing recession, brought on by the economic recession in the beginning of the decade. The second dip between 1999 to 2000 represents an 8% drop in housing sales in the region, only slightly smaller than the percent drop between 1994 and 1995. Still, housing sales were higher in 2000 than at any point between 1990 and 1997.

Table 3-4: Communities with an Increase in Housing Sales, 1990 - 2000

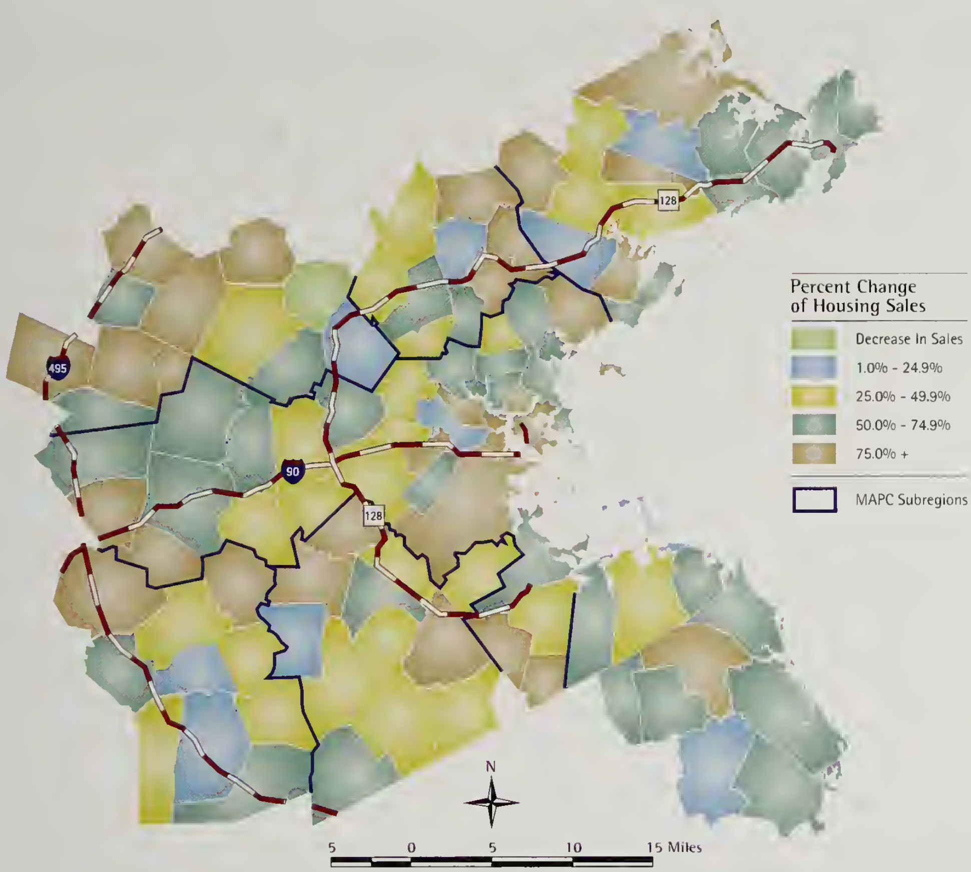
Rank	Subregion	City/Town	Number Sales in 2000	Increase from 1999
1	North Shore	Middleton	185	29.4%
2	SouthWest	Sherborn	111	29.1%
3	South Shore	Pembroke	387	11.5%
4	Inner Core	Lynn	1,498	10.3%
5	Minuteman	Bolton	176	9.3%
6	South Shore	Rockland	308	9.2%
7	Minuteman	Littleton	228	8.6%
8	North Shore	Essex	75	7.1%
9	SouthWest	Wrentham	265	6.9%
10	South Shore	Hanover	275	6.6%
11	Three Rivers	Sharon	353	5.7%
12	North Shore	Hamilton	116	5.5%
13	North Suburban	Woburn	643	5.1%
14	SouthWest	Norfolk	208	5.1%
15	Inner Core	Nahant	66	4.8%
16	Three Rivers	Dover	157	4.7%
17	MetroWest	Wayland	290	2.1%
18	North Suburban	Wilmington	366	1.9%
19	Inner Core	Randolph	603	1.9%
20	Minuteman	Acton	589	1.2%

Source: The Warren Group

Twenty cities and towns saw increases in housing sales between 1999 and 2000, despite the overall dip in sales experienced by the region as a whole. They are listed in Table 3-4 and ranked by percent increase in housing sales.

Twenty cities and towns saw increases in housing sales between 1999 and 2000, despite the overall dip in sales experienced by the region as a whole.

Map 3-2: Percent Change of Housing Sales by Community, 1990 and 2000



Source: The Worren Group

Despite various dips and rises in home sales, the 1990s brought a dramatic increase in home sales. The number of sales in 2000 exceeded the number in 1990 in every city and town except one (Bedford). In many communities, housing sales have more than doubled since 1990. Map 3-2 illustrates which areas have boomed in terms of home sales. The communities with the highest growth in sales, by and large, coincide with those that have had substantial population growth.

AFFORDABILITY

The region's housing supply directly affects housing affordability. When demand is high and the supply is tight, the price of housing increases. When the increase in a household's income does not keep pace with the increases in the price of housing, the housing stock becomes less and less affordable and takes up a larger portion of a household's economic resources. The lack of affordable housing in the area affects not only the household budget, but also has larger economic repercussions. A tight housing market may result in labor force shortages if potential workers cannot find housing within their means. Families that have less disposable income have less money to reinvest back into other areas of the economy. Therefore, it is critical to a sustainable regional economy to have a wide array of housing and rental options for households with varying needs.

Chart 3-7 illustrates the increasing strain between the region's median income and the income needed to purchase a home in the metropolitan area. The affordability gap is defined here as the difference between the income needed to buy a median priced home and median income in the metropolitan area.[13] In 1970, the income needed to afford the median priced home was about

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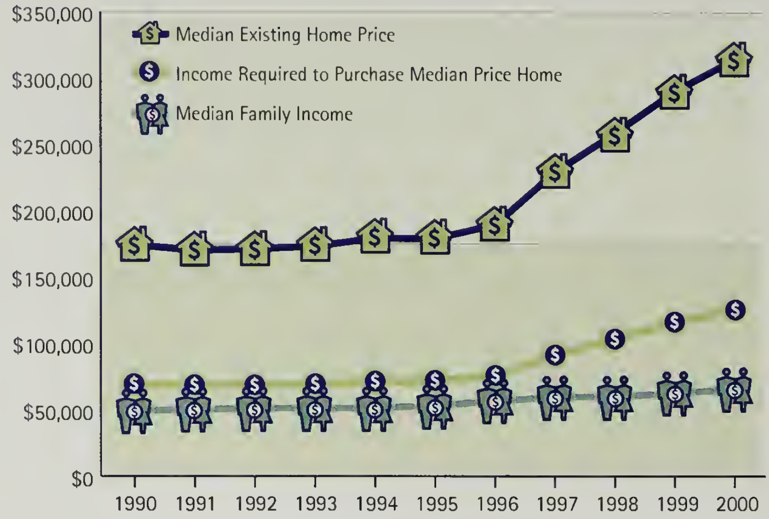
[13] Income in Chart 3-7 is based on data from the U.S. Department of Housing and Urban Development (HUD) for the Boston Primary Metropolitan Statistical Area (PMSA), which includes some communities outside the MAPC region.

Chart 3-7: Affordability Gap in the Boston Metropolitan Area, 1990 - 2000



Source: Median Family Income, 1970-1990 - U.S. Census Bureau; Median Family Income, 2000 - HUD; Median Existing Home Values, 1970-2000 - NAR; Income Required - MAPC Calculations

$2000 less than the median income, making housing affordable even for households with a single income, which was much more typical in 1970. In 1980, the median priced home was still within reach for many metropolitan area households, as the required income to buy a home was $400 more than the area's median income. The affordability gap became apparent during the price escalation of the late 1980s, when the gap between the median income of the area and the median income needed to purchase a median-priced house rose to $20,000 by 1990. The gap continued to widen over the past decade, and was at $60,000 in 2000. Currently, the number of sales is slowing but the strong appreciation of home prices continues, pricing out more potential residents. If, however, slowing sales continue and prices soften, the affordability gap may plateau or even decline for a while.

Among the many factors that contribute to escalating housing costs in the region are the high proportion of two-income households; the number of baby boomers in their peak earning years putting pressure on trade-up housing; employment opportunities that favor a highly skilled, educated, and well-paid workforce; and high land, construction, and labor costs. In many communities, fiscal pressures have led to a preference for large lot sizes and high end housing that brings in more revenue than it costs in local services, especially schools.

What income is necessary to buy a house in the region?[14]

Although the affordability gap in the region is widening, affordability within the region's cities and towns varies. Table 3-5 shows the cities and towns with the highest and lowest median home sales price and the income needed to purchase that home.

Households seeking housing in the communities with the lowest median home sale prices in the region, as listed in Table 3-5, need to make between $60,000 and $70,000 to purchase a home. Sale prices in these communities are still out of reach for a number of families. In order to purchase these homes, a household would have to have two full-time workers each making at least $16.80 per hour. Analysis of the full extent of the housing affordability problem is limited by the data available about household incomes and will be greatly enhanced by the release of Census 2000 income data in 2002.

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[14] Income needs are calculated based on the U.S. Department of Housing and Urban Development's (HUD) assumption that consumers should spend no more than 2 ½ times their annual income on housing costs.

Table 3-5: Highest and Lowest Median Home Sales Price and Income Needed to Purchase Median Prices Home, 2000

Subregion	City/Town	Median Price	Income Needed	Subregion	City/Town	Median Price	Income Needed
MetroWest	Weston	585,000	234,000	Inner Core	Lynn	152,000	60,800
Three Rivers	Dover	539,000	215,600	Inner Core	Chelsea	156,000	62,400
MetroWest	Wellesley	532,250	212,900	Three Rivers	Stoughton	158,000	63,200
Minuteman	Carlisle	527,400	210,960	Inner Core	Holbrook	161,000	64,400
Minuteman	Lincoln	482,500	193,000	SouthWest	Bellingham	165,000	66,000
SouthWest	Sherborn	452,500	181,000	Inner Core	Randolph	165,000	66,000
Minuteman	Concord	435,000	174,000	South Shore	Weymouth	166,500	66,600
North Shore	Wenham	430,000	72,000	Inner Core	Revere	169,000	67,600
Inner Core	Newton	425,000	170,000	South Shore	Rockland	170,000	68,000
Three Rivers	Needham	401,000	160,400	SouthWest	Milford	175,000	70,000

Source: The Warren Group

How are renters affected by the affordability gap?

Renters are also feeling the pressures of the metropolitan area's tight housing market. The National Low Income Housing Coalition (NLIHC) recently updated its 1998 study Out of Reach: The Growing Gap Between Housing Costs and Income of Poor People in the United States. This study documents the rental housing affordability crisis on a nationwide bases. In 2000, metropolitan Boston had the 9th highest "housing wage" in the nation. The "housing wage" is what a full-time worker needs to earn per hour in order to afford the area's fair market rent (FMR), given that no more that 30% of a person's income should be spent on housing costs. When the "housing wage" is compared to the minimum wage, the disparity between real wages and housing costs becomes apparent.

Table 3-6: Rental Affordability and the Housing Wage, 1990 and 2000

Location	1999 2BR Fair Market Rent	2000 2BR Fair Market Rent	2000 Estimated # Renters Unable to Afford 2BR	1999 2BR Housing Wage	2000 2BR Housing Wage	% Change in 2BR Housing Wage (1999 - 2000)	# Hours/wk needed to work at minimum wage ($6.00) to afford a 2BR
Massachusetts	$793	$854	46%	$15.26	$16.43	7.67%	110
Boston, MA- NH	$906	$979	46%	$17.42	$18.83	8.09%	126

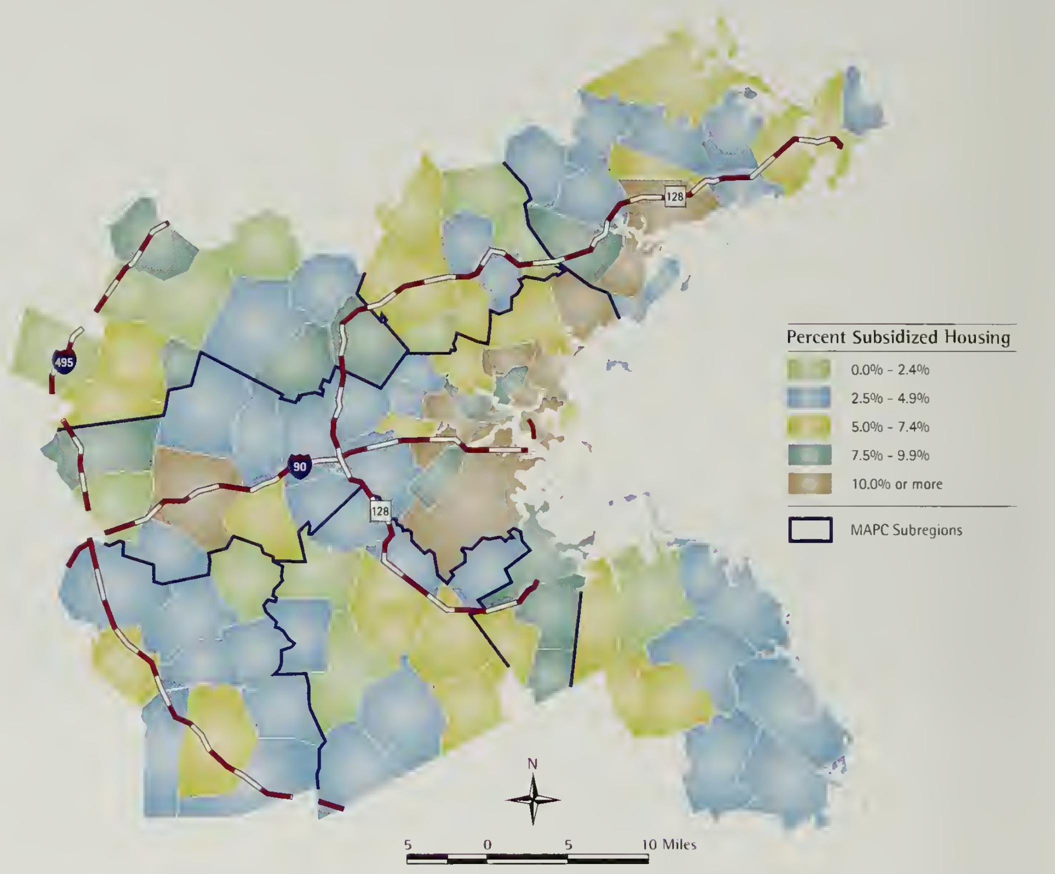
Source: The National Low Income Housing Coalition

Table 3-6 highlights disparities between rent and income in Massachusetts and Boston. In 2000, it is estimated that 46% of renters are unable to afford the fair market rent in Massachusetts and Boston. The needed "housing wage" in Massachusetts increased 8% between 1999 and 2000, from $15.26 to $16.43. Massachusetts' housing wage is 247% higher than the state's minimum wage ($6.00). The gap between housing cost and real income has increased in the Boston metropolitan area. The metropolitan area "housing wage" increased 8% between 1999 and 2000, from $17.42 to $18.83. A worker earning the Massachusetts minimum wage would have to work 126 hours per week to be able to afford the fair market rent in the Boston metropolitan area. Therefore, on average, families in the metropolitan area will need two workers per household working at least 63 hours per week each to afford a 2-bedroom rental unit at fair market rent.

What is the status of subsidized housing in the region?

Subsidized housing is an important part of the region's housing picture. Chapter 40B, the state's Comprehensive Permit Law, was enacted in 1969 as a tool to promote affordable housing. The law sets a target of 10% affordable housing units in each community, establishes a consolidated permit process, and allows developers to override local zoning under certain circumstances where communities have not met the 10% goal. The most recent inventory of subsidized housing units, conducted by the Department of Housing and Community Development (DHCD) in 2001, indicate that the region's percent subsidized housing is slightly higher than the state's, 9.53% compared to 8.39%. Map 3-3 presents local achievement in reaching the 10% goal.[15]

Map 3-3: Percent Subsidized Housing Units by Community, 2001



Source: Department of Housing and Community Development

Of the region's 101 communities, 9 have met the 10% mark, 12 are between 7.5 and 9.9%, 25 are between 5.0 and 7.4%, and 55 communities in the region have less than 5% affordable housing. The map shows that the Inner Core subregion has the largest concentration of communities with a high percentage of subsidized units, while outside of the core, only Salem, Beverly, and Framingham exceed the 10% goal. Since the last inventory, conducted in 1997, two communities, Revere and Framingham, have met the 10% goal. Lincoln, however, dropped from 10.05% to 8.43%, due to an increase in overall housing units without a corresponding increase in affordable units.[16] Between 1997 and 2001, a total of 60 communities built new affordable housing units, while 28 communities saw no change, and 12 communities had a decrease in affordable units. The communities that exhibited the greatest percent growth in subsidized units are listed in Table 3-7.

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[15] Map 3-3 presents data from an early Subsidized Housing Inventory release in 2001. DHCD representatives have since indicated that the response following the release of this inventory by some communities may lead to a revised release of this inventory.

[16] In the 1997 Subsidized Housing Inventory, DHCD used the 1990 Census housing unit count as the denominator in calculating the percentage of subsidized housing, while the 2001 inventory used the 2000 Census housing unit count as the denominator.

Table 3-7: Communities with the Fastest Growth in Subsidized Housing Units, 1997 –2001

Subregion	City/Town	Affordable Units 1990	Affordable Units 2000	Percent Change
North Suburban	Wilmington	159	394	147.8%
Inner Core	Hull	68	151	122.1%
MetroWest	Marlborough	592	1,180	99.3%
SouthWest	Holliston	78	153	96.2%
MetroWest	Weston	76	126	65.8%
North Shore	Danvers	279	428	53.4%
North Shore	Swampscott	128	187	46.1%
Inner Core	Everett	952	1,299	36.4%
Minuteman Area	Lexington	629	855	35.9%
Minuteman Area	Concord	139	177	27.3%

Source: MA Department of Housing and Community Development

THE CHALLENGES AHEAD

The region faces a number of serious challenges with regard to its housing stock. High on the list is the need for a diversity of housing types – including multi-family, rental, first-time homebuyer, and housing affordable to people with a range of incomes – especially in the suburbs. This diversity is especially crucial to the economy in terms of attracting workers, keeping wages competitive, and leaving residents with adequate discretionary income for non-housing goods and services. Communities also face a challenge in balancing housing, commercial and industrial growth, and preservation of open space. Fiscal concerns – especially school costs – often influence local decisions about growth in general and housing in particular.

SECTION FOUR: EDUCATION[17]

In an economy based increasingly on knowledge industries, education is more important than ever before. This region – home to the nation's first public school and to a wealth of world-class colleges and universities – prides itself on educational excellence.

This section explores some of the measures of educational success – how well our school systems and their students are doing. Test scores, access to technology, class size, and dropout rates are used to measure and compare school and student performance. Other factors, such as per pupil expenditure and school lunch eligibility, suggest the financial resources of school systems and the families they serve.

Public school enrollment in the region increased 16% between 1990 to 2000, three times more than the region's overall population increase. Enrollment levels climbed most during the early years of the decade and slowed gradually from 1995 to 2000. Still, the region's population of children under 18 grew at a relatively high rate over the decade, increasing more in the region than in the state or nation.

In 1998, the state introduced the Massachusetts Comprehensive Assessment System (MCAS), a testing program intended to improve academic achievement for public schools, teachers, and students. Still evolving, the MCAS is used as a tool to improve and measure academic performance and to determine graduation eligibility. The region generally does well when measured by this and other public education indicators in this section. When compared to the state, the region spends more money per student, school computers are more likely to have Internet access, students score better on formal tests, and the high school dropout rate is lower.

Although the region as a whole appears strong in terms of resources and performance, there are serious disparities among the individual school districts. Scituate, for example, did not have any high school dropouts in 1999, while Boston's public schools lost one out of every ten students. Moreover, data indicate significant ethnic and racial disparities in student achievement and retention. As the workplace becomes more technologically sophisticated and the student body becomes more diverse, the demands on the education system grow. There is constant pressure to narrow the performance gap, improve teaching methods and curriculum, and find the financial resources to provide and equitably fund high quality education for all.

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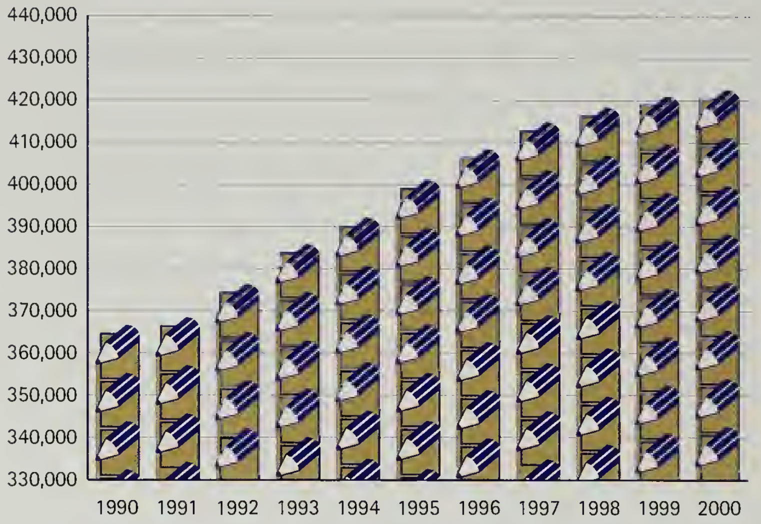
[17] When a community or subregion is discussed in this section, the reference is specifically to the public school district(s) where the majority of children within its boundaries attend school. Subregional calculations were done as follows: Lincoln-Sudbury High School's data were allocated to MetroWest since it is home to the majority of its students. Dover-Sherborn High School's data were included in both SouthWest and Three Rivers Subregion, since it is split evenly between the two. Furthermore, several communities share a high school, such as Acton-Boxborough and Concord-Carlisle, and therefore the same data were used for each town. Several communities also share K-6 facilities, such as Hamilton-Wenham, and Bolton-Stow, so their data are also the same. Data from vocational technical schools were included in enrollment totals only.

ENROLLMENT[18]

Chart 4-1: Public School Student Enrollment in the MAPC Region, 1990 - 2000



Source: Massachusetts Department of Education

In October of 2000, public school enrollment in the region totaled 422,824, a 0.4% increase from 1999 and a 16% increase from 1990. The most significant growth in enrollment took place in the early part of the decade, with slowed enrollment growth toward the end of the decade (see Chart 4-1). The region's young people are increasing at a higher rate than in the nation or the state. While the region's population under 18 years of age rose from 20% to 22% between 1990 and 2000, the nation's percentage remained unchanged and the state's actually declined slightly. A rapidly growing youth population will have an increasing impact on resource demands in schools, as communities outside of the Inner Core experience growth in student enrollment at a higher rate than Inner Core cities and towns. At the community level, the largest increases in young people occurred along the I-495 corridor, while minimal increases and even slight decreases took place in several Inner Core communities.

PER PUPIL EXPENDITURE (PPE)

Average PPE is one indicator of the resources available to students in a school district. Spending per student is different for different programs: "Regular Day" refers to the general course of instruction offered to the majority of public school students; "Special Education" refers to special instructional services to pupils whose educational needs cannot be satisfied in a regular day program; and "Transitional Bilingual Education" (TBE) refers to language training services for students with limited English. Funding needs vary significantly according to program. Special Education and TBE programs require smaller class sizes and teachers with specialized training and are therefore more costly per pupil than Regular Day programs. In addition, because Special Education services must be tailored to the nature and severity of the special needs of the students utilizing the services, spending varies greatly and can be considerably higher than both TBE and Regular Day programs.

Chart 4-2 illustrates PPE by program for the state, region, and subregions.[19] The region spends more than the state per student, on average, in all three programs. In terms of the Regular Day

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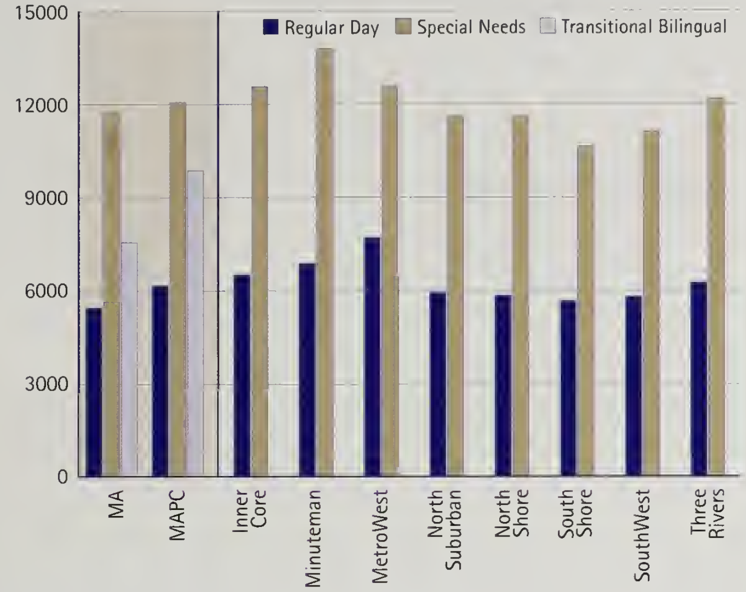
[18] Data indicate total enrollment for all public schools, including vocational, within the MAPC region as of October of the year shown.

[19] PPE for subregions and the region was calculated by finding the median value for all communities in the area. The median was chosen over the average to avoid weighting the value towards districts with exceptionally high or low PPE's.

Chart 4-2: A Comparison of PPE in MA, the MAPC Regions and the subregions, 1998



Source: Massachusetts Department of Education

program, the region's public schools spend an average of $6,161 per student. This is not uniform throughout the region, however, as seen by comparing subregions. MetroWest has the highest average PPE of $7,721, while the South Shore subregion has the lowest average PPE, at $5,666. Students participating in Special Education programs in the region have an average PPE of $12,094, almost twice as much as Regular Day PPE. Special Education PPE is the highest in the Minuteman subregion at $13,823 and the lowest in the South Shore subregion at $10,650. The region spends an average of $9,885 per student participating in the TBE program, over $2,000 more per student than the state. Since only 25 districts in the region received Transitional Bilingual dollars in the 1999/2000 school year, we have not calculated the PPE for this category at the subregional level. With the exception of some larger communities such as Peabody and Marlborough, TBE programs are generally concentrated in Inner Core cities where the need is the highest.

Table 4-1: Highest and Lowest PPE Districts, 1998

HIGHEST PPE DISTRICTS, 1999/2000			LOWEST PPE DISTRICTS, 1999/2000		
Subregion	**District**	**PPE**	**Subregion**	**District**	**PPE**
Inner Core	Cambridge	$11,326	North Shore	Middleton	$4,472
SWest/Three Rvrs.	Dover Sherborn	$9,837	Minuteman	Acton	$4,505
Minuteman	Concord Carlisle	$9,229	North Shore	Topsfield	$4,579
MetroWest	Lincoln Sudbury	$9,166	Inner Core	Randolph	$4,769
MetroWest	Weston	$8,289	Minuteman	Boxborough	$4,903
Minuteman	Lincoln	$8,215	SouthWest	Bellingham	$4,907
Inner Core	Waltham	$8,087	SouthWest	Hopkinton	$4,952
Inner Core	Watertown	$7,743	MetroWest	Southborough	$4,963
MetroWest	Framingham	$7,592	SouthWest	Norfolk	$4,965
Three Rivers	Westwood	$7,590	South Shore	Pembroke	$4,972

Regional Median = $5,936

Source: MA Department of Education

Table 4-1 lists the top ten communities with the highest and lowest Regular Day PPE. Several caveats are important here. First, PPE includes both local dollars and state funds, the latter allocated in part according to a community's wealth. Thus poorer communities get more state dollars. Second, some of the districts listed on Table 4-1 fund only high schools, while others fund only elementary schools, which tend to have lower costs per pupil. Seven of the ten districts with the lowest PPE are elementary districts only, while three of the highest PPE districts are high schools only. Some districts with dramatic enrollment increases do not show equivalent increases in funding. Boxborough, Southborough, and Hopkinton, for example, have low PPEs but had among the fastest growing population under 18 years over the decade. This strain has led some suburban communities to seek changes in the state's funding allocation formula that will take into account the impact of high growth on educational resource demand.

Since the inception of the MCAS, there have been significant attempts to modify and improve testing so MCAS will be successful in achieving its goals.

STUDENT TESTING[20]

MCAS tests were introduced to Massachusetts' public schools in 1998 as a tool to measure student and school performance, raise student achievement, improve classroom instruction, and determine student competency for graduation. Since the inception of the MCAS, there have been significant attempts to modify and improve testing so MCAS will be successful in achieving its goals. The MCAS tests also bring to light gaps in achievement. For example, test results tend to correlate with the socioeconomic status of families served by the local school systems and the educational attainment level of student's parents. Therefore, MCAS results add to the larger discussion regarding whether low-income and minority students have adequate access to the tools needed to test well.

Charts 4-3 and 4-4 show the percentage of students passing the MCAS, by subject, for 4th and 10th graders in the state and the region. Passing students include all who did not receive a failing score on the tests, or all who scored "needs improvement," "proficient," and "advanced." Results from all three test years are shown. These two charts highlight several findings. First, students in both grade levels tended to test better on the English, Language, and Arts (ELA) portion than in Math. However, greater improvement can be seen in Math than ELA throughout the three years of testing. Second, the region's passing rates were consistently higher than those statewide, regardless of subject or grade, although the difference is more pronounced among 10th graders. Third, passing rates were higher among 4th graders than 10th graders.

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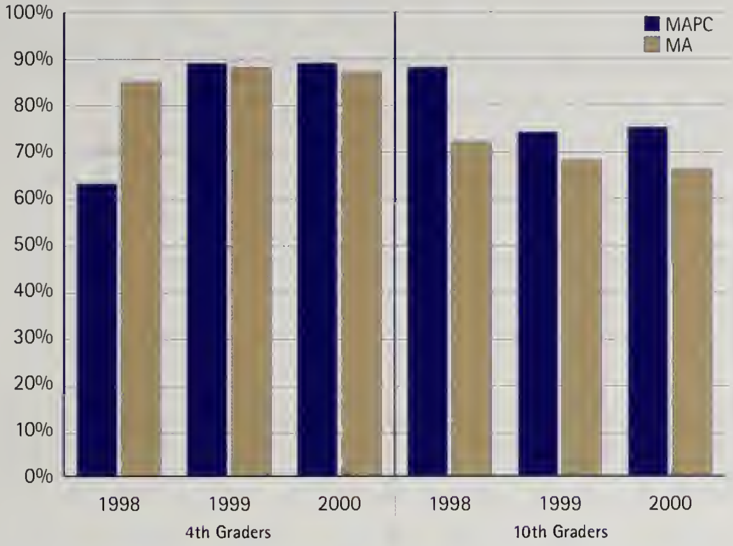
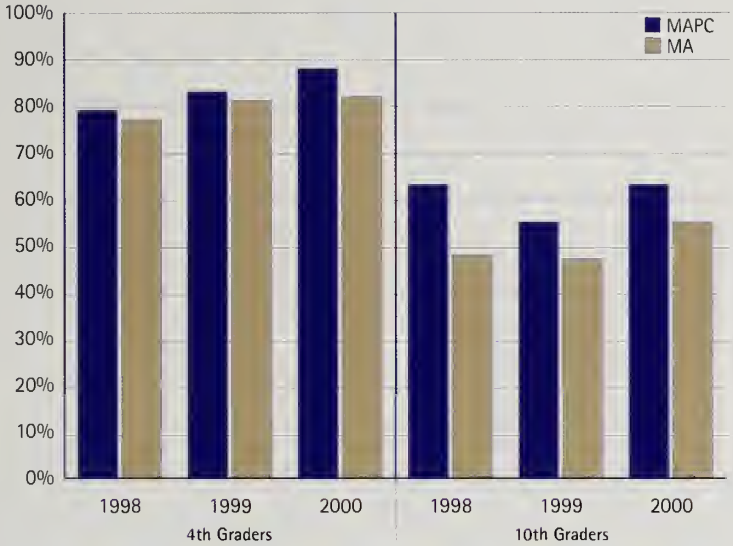
[20] MCAS results released in 2001 were not included in this report, as the focus is on the years between 1990 and 2000. It should be noted that the 2001 scores revealed significant improvements for the region, as the percent of 10th graders who failed ELA dropped 16 percentage points, and the percentage failing Math dropped 20 percentage points. State scores also improved significantly, but the overall percentage of students passing in ELA and Math remained lower in the state than the region.

Chart 4-3: Percent Passing English, Literature and Art MCAS, 4th and 10th graders in MA and the MAPC Region, 1999 – 2000



Source: Massachusetts Department of Education

Chart 4-4: Percent Passing Math MCAS, 4th and 10th graders in MA and the MAPC Region, 1999 – 2000



Source: Massachusetts Department of Education

When the individual communities are examined, it is clear that those in the Inner Core have a significantly lower passing rate than other communities. In 2000, 84% of the region's students passed the ELA portion, while only 69% passed in the Inner Core. In Math, 71% of the region passed, while 53% passed in the Inner Core. However, the Inner Core is the only subregion that did not exhibit a decrease in its percentage passing ELA from 1998 to 2000.

Tables 4-2 and 4-3 show the top five schools in terms of highest and lowest percent of 10th graders passing in ELA and Math. It is apparent that Inner Core schools dominate those with low MCAS achievement, with Boston, Somerville, and Chelsea ranking among the lowest percent passing on both tables. Wayland 10th graders show up in the top five in highest percentage passing on both tables.

Table 4-2: Highest and Lowest Percent 10th Graders Passing English MCAS, 2000

HIGHEST % PASSING ENGLISH MCAS			LOWEST % PASSING ENGLISH MCAS		
Subregion	**District**	**% Passed**	**Subregion**	**District**	**% Passed**
Minuteman	Littleton	96%	Inner Core	Boston	51%
South Shore	Duxbury	95%	Inner Core	Somerville	51%
Inner Core	Belmont	95%	Inner Core	Chelsea	52%
South Shore	Cohasset	95%	SouthWest	Bellingham	58%
MetroWest	Wayland	95%	Inner Core	Lynn	59%

Regional Median = 81

Source: MA Department of Education

Table 4-3: Highest and Lowest Percent 10th Graders Passing Math MCAS, 2000

HIGHEST % PASSING MATH MCAS			LOWEST % PASSING MATH MCAS		
Subregion	**District**	**% Passed**	**Subregion**	**District**	**% Passed**
South Shore	Norwell	91%	Inner Core	Cambridge	26%
MetroWest	Wayland	89%	Inner Core	Boston	34%
MetroWest	Weston	88%	Inner Core	Somerville	36%
North Suburban	Winchester	88%	Inner Core	Chelsea	39%
MetroWest	Wellesley	87%	Inner Core	Everett	43%

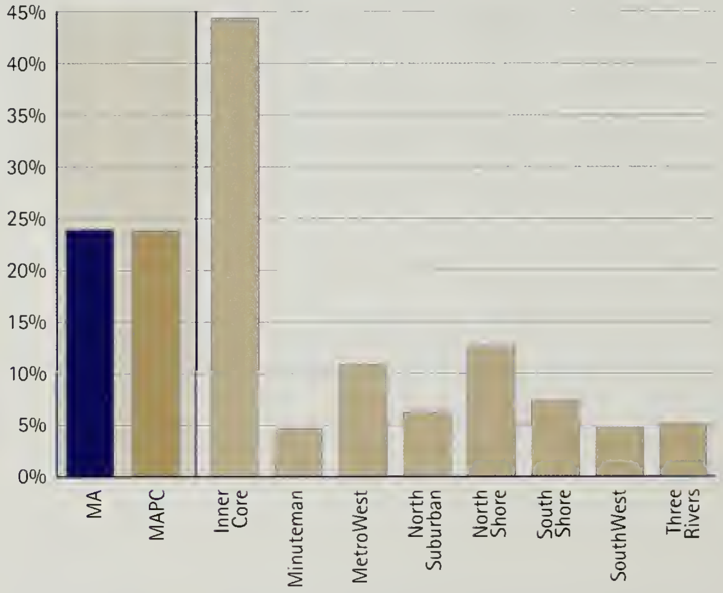
Regional Median = 71

Source: MA Department of Education

FREE OR REDUCED PRICE LUNCH ELIGIBILITY

One indicator of need in the schools is the number of students eligible to receive free or reduced price lunch. The federal government uses this information in Title I funding allocation.[21] In order to qualify for the free or reduced price lunch program, a family must meet certain low-income standards. Chart 4-5 shows by subregion the percentage of students in grades K-12 who are eligible.

Chart 4-5: Percentage of Students Eligible for School Lunch Program in MA, the MAPC Region, and Subregions, 1999



Source: Massachusetts Department of Education

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[21] Title I is a federal program that involves the distribution of federal funds to states, which then allocate them to schools based on the number of income-eligible children.

Regionwide, 24% of K-12 students are eligible for lunch assistance, equaling the state figure (see Chart 4-5). At a subregional level, the need for assistance in the Inner Core greatly outweighs the need in other subregions, affecting the overall regional figure. Poverty in school districts such as Chelsea, Boston, and Somerville, where over 50% of students are eligible for free or reduced price lunches, brought eligibility in the Inner Core up to 45%. The North Shore subregion has the next highest percentage of free or reduced price lunch eligibility (12.7%), led by Salem and Gloucester. The Minuteman and SouthWest subregions tie for lowest eligibility for lunch assistance (4.7% and 4.8% respectively), followed closely by Three Rivers.

The predominance of Inner Core communities with high lunch assistance eligibility is apparent in Table 4-4, which lists the top ten school districts with the highest and lowest percentage of students eligible for free or reduced price lunch.

Table 4-4: Highest and Lowest School Lunch Program Eligibility, 1999

HIGHEST % LUNCH ELIGIBLE			LOWEST % LUNCH ELIGIBLE		
Subregion	**District**	**% Eligible**	**Subregion**	**District**	**% Eligible**
Inner Core	Chelsea	83%	Minuteman Area	Carlisle	0%
Inner Core	Boston	72%	North Shore	Manchester-Essex	0%
Inner Core	Somerville	69%	Inner Core	Nahant	0%
Inner Core	Lynn	47%	Minuteman Area	Acton-Boxborough	1%
Inner Core	Revere	41%	Three Rivers	Dover	1%
Inner Core	Cambridge	39%	SWest/Three Rvrs.	Dover-Sherborn	1%
Inner Core	Everett	37%	South Shore	Duxbury	1%
North Shore	Salem	36%	SouthWest	Holliston	1%
Inner Core	Malden	34%	SouthWest	Hopkinton	1%
Inner Core	Quincy	28%	Three Rivers	Medfield	1%

Regional Median = 5.0

Source: MA Department of Education

TECHNOLOGY IN THE CLASSROOM

Access to computers is an important indicator of how well our schools are preparing children for the future. Solid instruction in computer learning helps provide young people with the skills necessary to be competitive in the region's workforce. In today's job market, higher-paying jobs often rely on at least a basic, if not an advanced understanding of technology. Chart 4-6 illustrates the number of students per computer in the state, region, and subregions.[22]

Access to computers is an important indicator of how well our schools are preparing children for the future.

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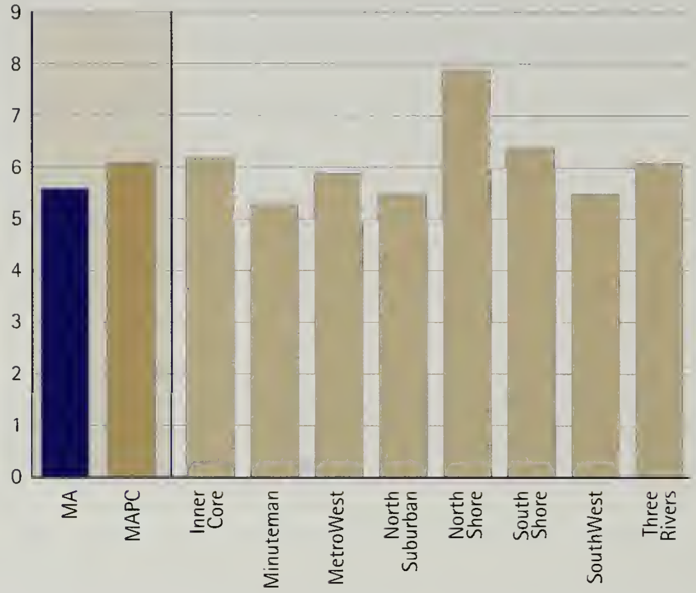
[22] Subregional data were calculated by finding the median value of the communities contained within it.

Chart 4-6: Number of Students per Computer in MA, the MAPC Region, and Subregions, 1999



Source: Massachusetts Department of Education

With an average of 6.1 students per computer, students in grades K-12 in the region have slightly less access to computer use than in Massachusetts as a whole. The Minuteman, North Shore, and SouthWest subregions had the fewest students per computer. However, high student-to-computer ratios in the North Suburban subregion, and to a lesser extent in the South Shore and Inner Core, serve to lift the regional average. Table 4-5 shows the five communities with the highest and lowest number of students per computer.

Table 4-5: Most and Least Students per Computer, 1999

MOST STUDENTS PER COMPUTER			LEAST STUDENTS PER COMPUTER		
Subregion	**District**	**Students/Computer**	**Subregion**	**District**	**Students/Computer**
Inner Core	Holbrook	53.1	Inner Core	Malden	1.3
Magic	Lincoln	31.4	SWAP	Wrentham	2.5
SSC	Marshfield	20.5	TRIC	Canton	2.7
Magic	Carlisle	15.1	MetroWest	Weston	2.9
NSPC	Winchester	13.8	TRIC	Stoughton	3.0

Regional Median = 6.1

Source: MA Department of Education

Table 4-5 highlights the difference in resources among school districts, as the number of students per computer ranges from 1.3 to 53. The higher end of the range (53) is an extreme case, however, as the median number of students per computer for the region is 6.1, and only 12 school districts in the region have more than 10 students per computer.

Another important indicator of how well a school is able to prepare students for the increasingly technology-based labor force is access to the Internet. Half of the public schools in the region reported that 100% of their computers had access to the Internet. Chart 4-7 shows the percent of computers per subregion that had Internet access.[23]

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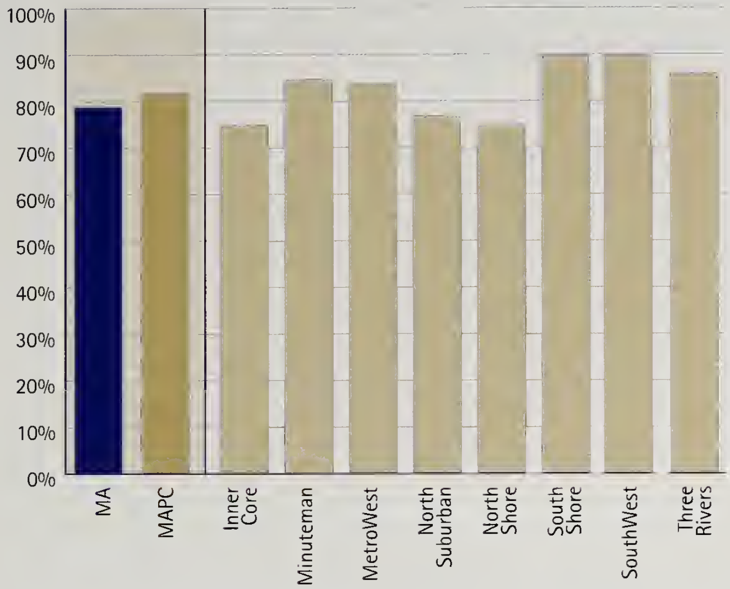
[23] Subregional data were calculated by finding the average value of the communities contained within it. The median was not used so subregions would not show 100% Internet access when in fact not all of the schools within it were 100% online.

Chart 4-7: Percent computers on the Internet in MA, the MAPC Region and Subregions, 1999

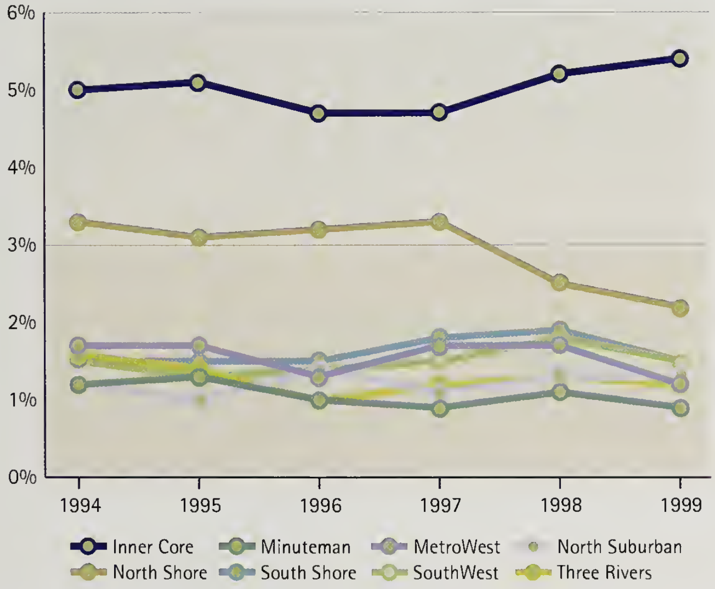


Source: Massachusetts Depertment of Educotion

Compared to the state, the MAPC region has a slightly higher percentage of school computers with access to the Internet. The North Suburban and Inner Core subregions, which also exhibited relatively high student to computer ratios, had the smallest percentage of computers with Internet access (75% each). Conversely, the South Shore and SouthWest subregions had a high percentage of computers with Internet access (90% each).

DROPOUT RATES[24]

Chart 4-8: Dropout Rate Trends in the MAPC Subregions, 1994 – 1999



Source: Mossochusetts Deportment of Educotion

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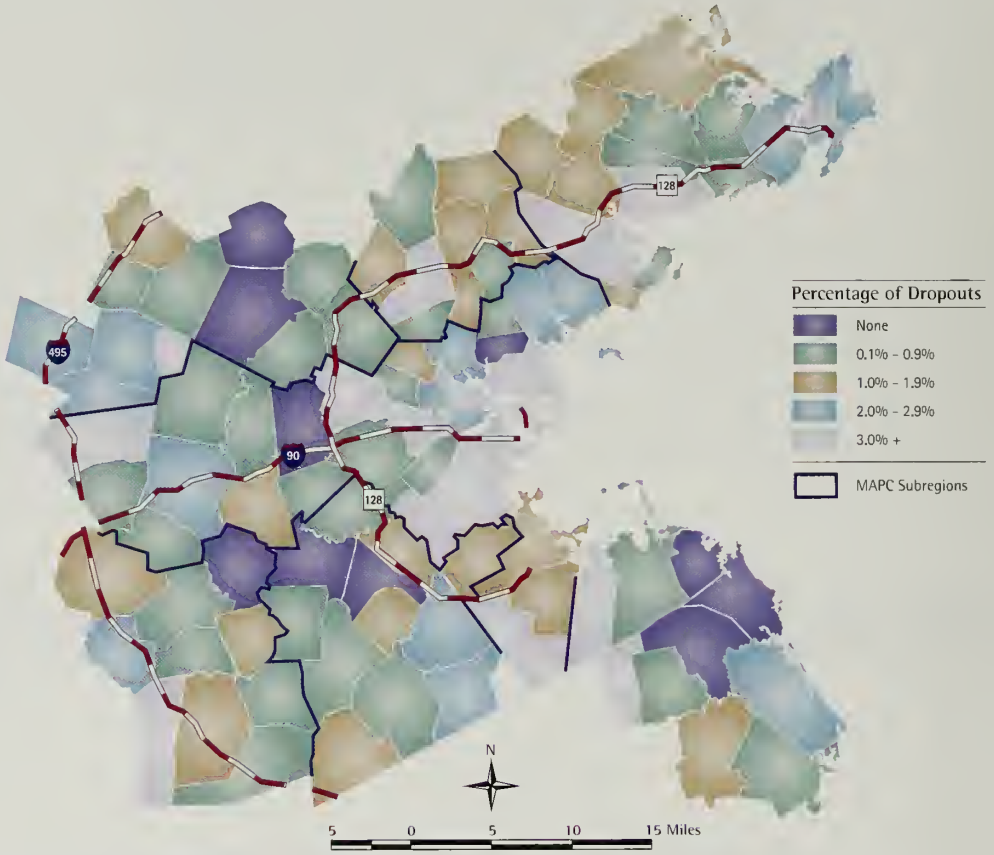
[24] Community calculations for dropout rates involved the following: Algonquin Regional High data were used for Southborough, and Silver Lake Regional High data were used for Pembroke, although both schools also service students outside the region.

The Department of Education defines a dropout as "a student in grade nine through twelve who leaves school prior to graduation for reasons other than transfer to another school and does not re-enroll before the following October 1." Using this definition, the regional dropout rate was 3% for the 1998/1999 school year. Overall, dropout rates in the region appear to be improving. Chart 4-8 shows dropout rates by subregion from 1994 to 1999.

All subregions experienced a decline in dropout activity from 1998 to 1999, with the exception of the Inner Core. Of the 22 Inner Core communities, half succeeded in lowering their dropout rate. Unfortunately, this improvement was offset by other Inner Core communities with increased dropout activity, particularly Chelsea, Revere, and Holbrook.

Map 4-1: Public School Dropout Rate by Community, 1998



Source: Massachusetts Department of Education

Map 4-1 illustrates that individual school districts varied significantly in their success with student retention. The map presents the overall dropout rate of high school students in each community. Of the 19 communities with a dropout rate over 3%, 10 are located in the Inner Core. Chelsea exhibits the highest dropout rate in the region (12%), followed by Boston (10%). Ten high schools reported having no dropout activity in the 1998/99 school year: Carlisle, Cohasset, Concord, Dover, Malden, Norwell, Scituate, Sherborn, Weston, and Westwood.[25]

Table 4-6 lists the schools that saw the largest decreases and the largest increases in dropout activity between 1994 and 1999.

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[25] The Department of Education's data report Malden as having no dropouts in 1999. Several document reviewers questioned this statistic; however, research found that there was no other rate available.

Table 4-6: Most Improved and Highest Increase in Dropout Rate, 1994-1999

MOST IMPROVED DROPOUT RATE, 1994 - 1999			LARGEST INCREASE IN DROPOUT RATE, 1994 - 1999		
Subregion	**District**	**% Increase**	**Subregion**	**District**	**% Increase**
Inner Core	Lynn	-6.6	Inner Core	Chelsea	10.9
Inner Core	Malden	-6.5	Inner Core	Revere	3.2
North Shore	Beverly	-2.8	Inner Core	Holbrook	2.7
North Suburban	Wakefield	-2.0	North Suburban	Woburn	2.4
Minuteman	Littleton	-1.9	Inner Core	Boston	2.3
Three Rivers	Dedham	-1.7	Inner Core	Everett	1.5
Three Rivers	Foxborough	-1.5	Inner Core	Waltham	1.1
MetroWest	Marlborough	-1.3	South Shore	Marshfield	0.8
North Shore	Ipswich	-1.3	South Shore	Rockland	0.8
North Shore	Peabody	-1.1	North Suburban	North Reading	0.7

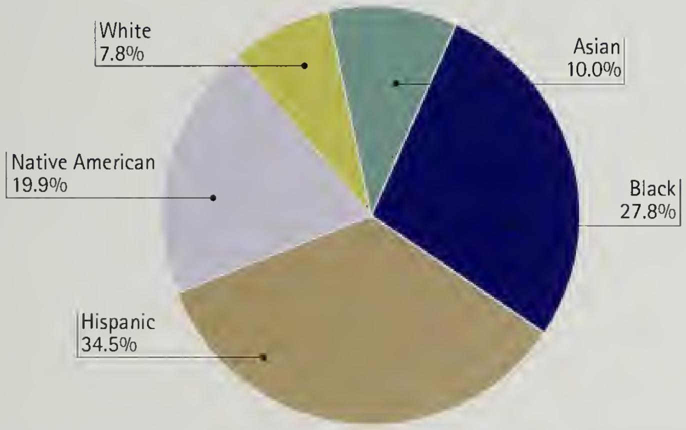
Regional Median = -.02

Source: MA Department of Education

Do dropout rates vary by race and ethnicity?

Chart 4-9 shows the distribution by racial and ethnic category of students who dropped out. Dropout rates are disproportionately high among minority students, as Hispanic students make up 9% of the student population and 34% of dropouts. Similarly, Black students represent 14% of enrolled students and 28% of dropouts. This is consistent with the fact that Inner Core communities have the highest dropout activity and a significant concentration of minorities. Dropout rates were the highest in Chelsea and Boston, where minority populations combine to make up a majority of the people. This disparity calls attention to an important area for educational policy-makers, suggesting where retention efforts can be most effectively targeted to reach higher-risk students.

Chart 4-9: Dropout Rate by Race and Hispanic Origin in the MAPC Region, 1999



Source: Massachusetts Department of Education

THE CHALLENGES AHEAD

As we have seen, a number of challenges face today's educational institutions. These include educational quality – how well our schools prepare young people for both a complex world and a technically demanding workplace; educational equity – whether our schools provide equal educational opportunity for a diverse population; financial equity – who pays and who benefits; and financial resources – how we fund quality education in a time of lean budgets.

Photo: Cindy Suaréz, The Boston Found

SECTION FIVE: COMMUNITY VITALITY

Community vitality is a difficult characteristic to measure. It is something that is felt rather than calculated, since it deals with qualitative attributes such as pride in community, personal investment in a place, and bonds between neighbors. When residents go beyond the basic requirements, such as paying taxes and obeying laws, and begin to voluntarily invest time and energy in their community, communities begin to strengthen in appearance and character, thus improving the quality of life of the residents who live there.

This section looks at a few common measures of community investment for which we had solid data: voter participation, crime, and neighborhood stability and civic and community engagement. They are indicators of community vitality because they are predicated on caring for one's community and those who live in it.

Voter registration has risen dramatically throughout the region, outpacing the growth of the voting age population. Ten people registered for every person who became eligible to vote. A large contributing factor was passage of the "motor voter" law in 1994, which allows people to register when transacting permits and renewals at the Registry of Motor Vehicles. And although people in the Inner Core are traditionally less likely to vote than those in surrounding subregions, Boston and Cambridge both saw the largest increases in registration relative to their increase in eligible voters. Party affiliation data show that the majority of the registered voters in the region are not enrolled in a political party, while 39% are registered Democrat and 13% are registered Republican.

Crime data show improvement in community vitality and quality of life, as there were 68,230 fewer reported crimes in the region in 2000 than in 1990. This is particularly significant considering that the population has grown by 143,460 people in the same time period. The region saw a dramatic decrease in violent crimes, which dropped 147% since 1990. And although the Inner Core has had a traditionally higher crime rate than the suburbs, this too is improving, as Boston led the Inner Core communities with a decrease in crime of 55% over the decade.

A quality of life survey conducted by the University of Massachusetts provides further evidence that people are generally connected to their neighborhood and consider it more than simply a place to live. The majority of respondents were homeowners, had been living in their home for several years, and planned to stay in their homes for many years to come. This was particularly true for families with children. The level of investment waned, however, when residents were asked if they gave of their time for community meetings or events. When asked how they learned about community issues, the overwhelming majority responded that they followed government and public affairs through watching television or reading the newspaper, indicating a basic awareness of local and regional issues.

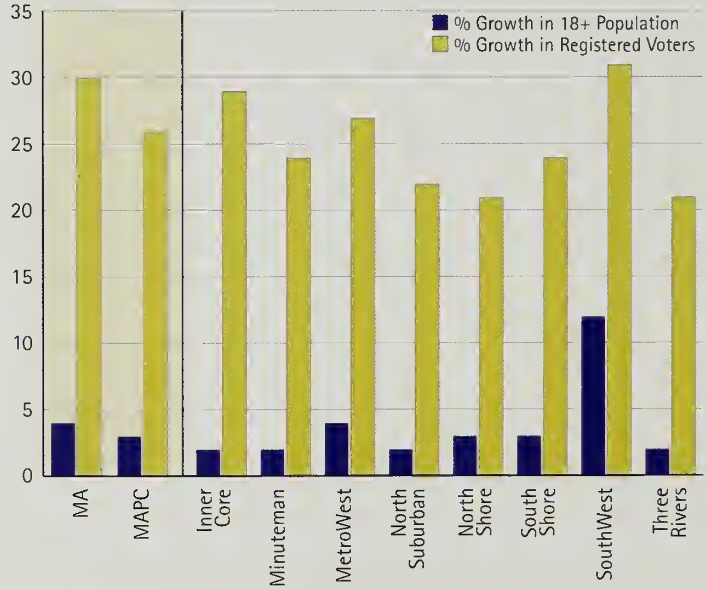
> One sign that residents are committed to their community is willingness to be active voters in local and state elections.

The findings presented in this section send a positive message about community vitality in our region. Other strong indicators of community vitality, such as locally owned business establishments, involvement in community groups, and healthy race relations, unfortunately lack readily available data. Community participation has a long tradition in New England, where local home rule, volunteerism, and town meetings abound. As people move more frequently and the demands of work and family consume more of people's time, it often becomes more difficult to engage newcomers in community activities. Similarly, patterns of auto-dependent sprawl tend to decentralize communities, making it harder for people to interact on a regular basis. Nonetheless, this section shows the region's strength and resilience.

VOTER PARTICIPATION

One sign that residents are committed to their community is willingness to be active voters in local and state elections. Residents who believe that their vote counts tend to be highly invested in the betterment of their community. This is not to say that people who do not vote do not care about their community, however, and factors such as limited mobility and diminished trust in the political system may also affect a person's decision to vote.

Chart 5-1 Percent Growth of Registered Voters Compared to Voting Age Population MA, MAPC Region, and the Subregions, 1990-2000

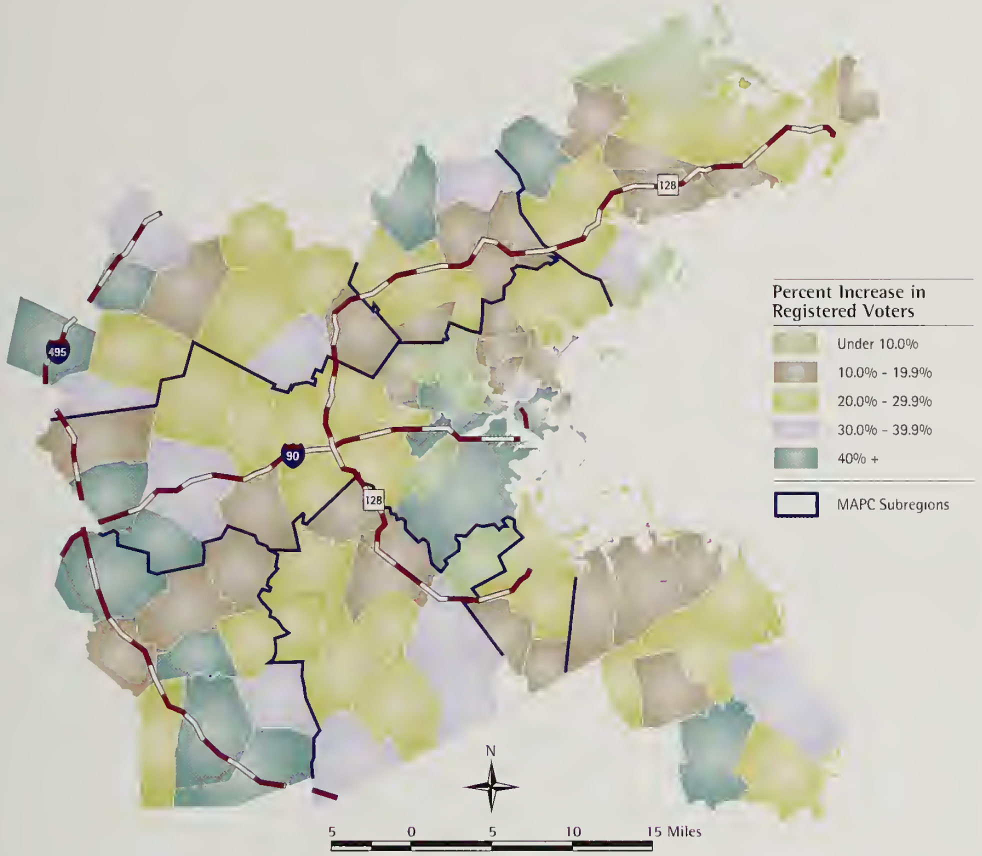


Source: Massachusetts Secretary of the Commonwealth, Elections Division

Chart 5-1 compares the growth rate of the voting age population (those 18 years old and over) with the growth rate of registered voters from 1990 to 2000. It is clear that voter registration increased at a higher rate than growth in the population 18 and over. The state's registrations increased at 8 times the rate of increase in voting age persons, while the MAPC region's voter registrations grew at 10 times the rate of growth of persons of voting age. The subregion where this was most pronounced was in the Inner Core, where voter registration grew at 15 times the rate of voting age persons. And although the SouthWest subregion had the highest percent increase in registered voters, it also saw the highest percent increase in voting age persons, resulting in registration increasing 2.6% more than the voting age population.

The percentage of eligible voters who were registered rose 22% over the decade, reaching 82% by 2000. The rapid increase in voter registration is partly attributed to the increased ease in registration made possible by the 1994 "motor voter" law, which allows people to register to vote at Registry of Motor Vehicle locations.

Map 5-1: Growth in Voter Registration by Community, 1990 – 2000



Source: MA Secretary of the Commonwealth, Elections Division

Map 5-1 illustrates the growth of registered voters by community over the decade, allowing us to identify the communities that exhibited the greatest and least change in voter registration levels. Communities with high registration growth generally correspond with those with high population growth, as seen along the I-495 corridor and in the SouthWest subregion. However, there were several areas where there was rapid growth in voter registration despite slower population growth, including Boston and Cambridge.

Table 5-1 lists the communities with the largest differences between the growth rate of eligible voters and registered voters, thus indicating greatest increases in voter registration independent of the growth in eligible voters.

Table 5-1: Top 10 Communities where Voter Registration Outpaced Population Growth

Subregion	Community	% Growth 18+	% Growth Reg'd Voters	Point Difference
Inner Core	Boston	1.8%	49.5%	47.7
Inner Core	Cambridge	7.0%	49.4%	42.4
Minuteman	Boxborough	32.2%	69.7%	37.4
MetroWest	Framingham	0.5%	35.0%	34.6
MetroWest	Ashland	16.6%	49.9%	33.4
SouthWest	Wrentham	13.5%	45.7%	32.2
MetroWest	Wellesley	-6.0%	26.0%	32.1
North Shore	Salem	4.5%	35.4%	31.0
SouthWest	Medway	18.3%	49.0%	30.8
Three Rivers	Stoughton	1.1%	31.7%	30.5

Source: MA Secretary of the Commonwealth, Elections Division

The top two communities where growth in registered voters significantly outpaced the growth of eligible voters are Boston and Cambridge, two Inner Core cities with historically low voter turnout in comparison to other communities in the area. Framingham is another large community with a significant increase in voter registration: the voting age population barely increased while the number of registered voters grew by 35%.

What are the political affiliations of the region's registered voters?

Voters may choose to affiliate themselves with a political party when they register to vote. Of the approximately 2 million registered voters in the region, 47% are not enrolled in a political party, 39% are registered Democrat, 13% Republican, and 1% other. Table 5-2 lists the communities where the political parties with the greatest enrollment in the region, Democrat and Republican, are found in highest concentration.

Table 5-2: Communities with the Highest Democrat or Republican Affiliation, 2000

HIGHEST % REGISTERED DEMOCRAT			HIGHEST % REGISTERED REPUBLICAN		
Sub Region	**City and Town**	**# Releases**	**SubRegion**	**City and Town**	**# Releases**
Inner Core	Cambridge	56%	TRIC	Dover	34%
Inner Core	Somerville	55%	NSTF	Wenham	34%
Inner Core	Chelsea	54%	SWAP	Sherborn	27%
Inner Core	Revere	53%	NSTF	Hamilton	26%
Inner Core	Boston	53%	NSTF	Mnchstr-by-the-Sea	26%
Inner Core	Everett	50%	METRO	Weston	26%
Inner Core	Arlington	49%	NSTF	Topsfield	26%
Inner Core	Quincy	48%	METRO	Wellesley	25%
Inner Core	Lynn	46%	NSTF	Essex	24%
Inner Core	Watertown	46%	SSC	Duxbury	24%

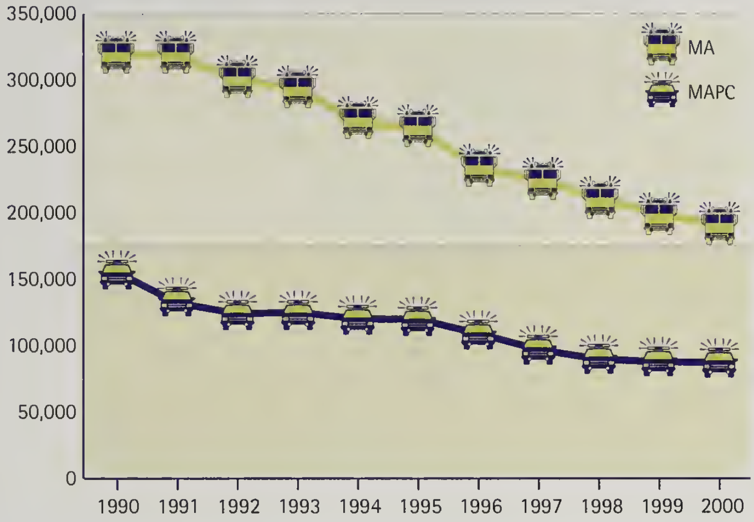
Source: MA Secretary of the Commonwealth, Elections Division

Clearly, Inner Core communities have the highest concentration of Democrats, while the highest percentages of Republicans tend to be in smaller residential communities in the region. Furthermore, it illustrates that the highest percentages of Republicans in the region are relatively low in comparison to Democrats.

CRIME

Crime trends are a key indicator of community health, as a low crime rate generally indicates neighborhood vitality. Moreover, a lowered crime rate in an area where crime is traditionally high can also be an indicator of increasing community investment.

Chart 5-2 Total Number of Reported Crimes in MA and the MAPC Region, 1990-2000



Source: Massachusetts State Police Crime Reporting Unit

Chart 5-2 shows that crime in both Massachusetts and the MAPC region has declined throughout the 1990s.[26] In the region, crime dropped 15% between 1990 and 1991, rose slightly from 1992 to 1993, and then declined steadily for the rest of the decade, with substantial decreases in 1996, 1997, and 1998. By 2000, the number of reported crimes was less than half of the number in 1990, despite the fact that the population grew by over 143,000 people.

Crime trends are a key indicator of community health, as a low crime rate generally indicates neighborhood vitality.

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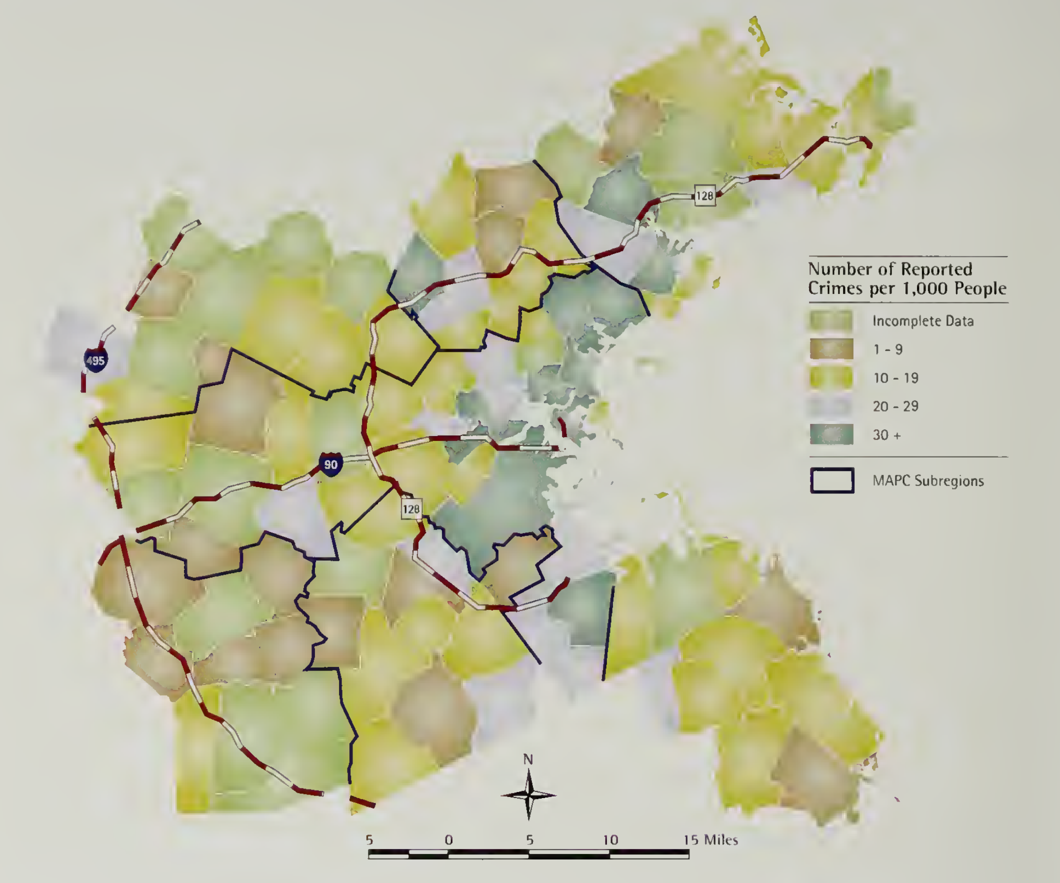
[26] Crime data represented in Chart 5-2 includes all reported crimes. Some communities have not reported crimes to the Massachusetts State Police, and therefore, the regional total does not reflect an exact count.

Map 5-2: Number of Reported Crimes per 1,000 People by Community, 2000)

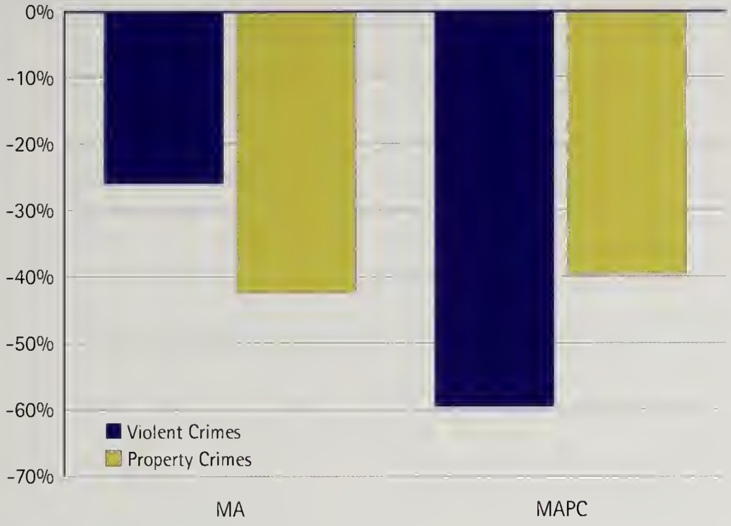


Source: MA Department of Public Safety

Map 5-2 illustrates per capita crime throughout the region in 2000. Several communities are omitted from analysis due to incomplete or unreported data. Generally, the lowest crime rates are scattered among communities outside of the Inner Core. Although per capita crime tends to be higher in the Inner Core, notable exceptions are Arlington, Belmont, Melrose, and Newton, all with a crime rate below the median for the communities that reported (15.1 per 1,000 residents). Boston, Saugus, and Lynn ranked as the top three highest crime areas, all with over 50 crimes reported per 1,000 residents. The crime rates in these cities improved significantly since 1990, however, with Boston having the largest decrease of 54%.

Reported crimes are classified as violent or property crimes and compared for the state and the region between 1990 to 2000 in Chart 5-3. Violent crimes include murder, rape, robbery, and aggravated assault, while property crimes include burglary, larceny, and automobile theft. The chart shows that the MAPC region had a more dramatic drop in violent crimes throughout the decade than the state, while the region's percentage drop in property crime closely parallels the state. Moreover, Chart 5-3 shows that while both types of crime declined in the region, violent criminal activity declined at a higher rate than property crime.

Chart 5-3: Decrease in Reported Property and Violent Crimes in the MA and the MAPC Region, 1990- 2000



Source: Massachusetts State Police Crime Reporting Unit

QUALITY OF LIFE

The findings in this section were generated from a telephone survey conducted by the Center for Survey Research at the University of Massachusetts in 2001.[27] People in 123 cities and towns in the greater Boston area were asked a variety of questions that pertain to quality of life issues, including the respondents' perceptions of their neighborhoods and level of civic engagement. Responses were divided according to whether or not there was a child in the family. Some of the more revealing results in relation to community vitality are summarized in Table 5-3.

In general, respondents with children tended to express a greater sense of neighborhood stability than those without.

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[27] The 2000 Boston Area Survey was coordinated by the Boston Community Building Network at The Boston Foundation. A survey advisory committee with representatives from public agencies, community organizations, and academic institutions developed the sampling plan and survey content. The metro area analyzed is the Primary Metropolitan Statistical Area (PMSA), defined by the U.S. Census as 123 cities and towns in the surrounding Boston area. These communities overlap MAPC's region and are therefore a fair representation of the region. The data reported by this survey do not represent entire communities, as the sample is limited to those who have a telephone. Moreover, a disproportionately high percentage of the respondents are homeowners. Nonetheless, the survey provides a valuable basis for understanding community vitality among the population surveyed in the metropolitan region.

Table 5-3: Select Community Vitality Indicators, 2001

Survey Topics	At least 1 Child	Total Cases	No Children	Total Cases
Neighborhood Stability				
*Average year moved to their town	1985	279	1982	455
*Six or more years in community	71%	278	64%	456
*Likely that resident will be in same home in 5 years	81%	278	67%	441
*Owns home	76%	276	66%	450
* "Feel part of the neighborhood, rather than just a place to live"	77%	271	64%	445
Overall neighborhood cleanliness is good or better	89%	277	90%	451
Consider streets in neighborhood very or mostly safe at night.	76%	275	80%	439
*Has contact with a neighbor once a week or more.	80%	280	70%	455
Civic and Community Engagement				
*Aware of community events and activities some or most of the time	71%	279	56%	456
Attended a Community meeting in the last 12 months	24%	280	22%	455
*Volunteered at a charitable or community service organization	47%	278	39%	454
Given money to a charitable or community service organization	84%	280	81%	456
Read greater Boston newspapers to follow public affairs	82%	239	83%	416
Watch television to follow government and public affairs	92%	240	90%	417
*Attended a community festival or celebration in the last 12 months	76%	277	59%	456

Source: University of Massachusetts, Boston, Center for Survey Research
**Statistically significant difference between households with children vs. without children (based on mean t-test or chi-square test, as appropriate).*

Homeownership and long-time residency in the community are positive indicators of community investment. Of the people surveyed, the majority had been in their homes for 6 years or more, and 81% of respondents with children intended to be living there in the same home in 5 years. In terms of overall quality of life, the general perception among the respondents was that they felt part of their neighborhood, and most had frequent contact with neighbors. Approximately 90% of respondents felt that their neighborhood was clean, and about 80% considered it safe at night. In general, respondents with children tended to express a greater sense of neighborhood stability than those without.

With its long tradition of local home rule, town meeting, and other forms of democratic process, New England depends heavily on community involvement and citizen participation.

Photo: *The Boston Foundation*

Percentages dropped slightly when it came to residents actually giving their time to community affairs. People scored low in attendance at community meetings and volunteering, although a majority had donated money. Moreover, an overall high percentage of respondents maintained knowledge of government and public affairs through newspapers and television, indicating an interest in current events.

THE CHALLENGES AHEAD

With its long tradition of local home rule, town meeting, and other forms of democratic process, New England depends heavily on community involvement and citizen participation. As people move more frequently and as the demands of work and family limit people's discretionary time, the challenge of community involvement grows. Sprawl-type development, with fewer town centers, more separation of uses, and more auto-dependence, adds to the challenge of engaging people in their neighborhood and community. More concentrated, transit-friendly development with a mix of uses may well be more conducive to civic life.

SECTION SIX: TRANSPORTATION

By and large, where we choose to site development determines how efficiently we utilize our existing transportation corridors and how great our need for new investment in infrastructure will be. As our transportation needs increase with population and job growth, the impact of transportation on our quality of life and environment increases as well.

A critical contributor to our economic productivity, transportation systems, if not carefully designed, have the potential to compromise natural resources, diminish safety, and reduce mobility—rather than enhance it. This section provides a glance at the impact of transportation systems on the region and the greater Boston area by looking at trends in automobile ownership and usage, vehicle miles traveled, congestion, public transportation ridership, and automobile accidents.

The region's transportation trends exhibit some of the symptoms associated with sprawl and the disconnect between transportation and land use. Underutilized transportation systems that exist in order to service lightly developed areas are an issue for the region. While lower land prices, increased privacy, and attractive landscapes offer strong incentives for residents to look outside of dense areas for homes and jobs, the high costs of servicing such areas with roads and other infrastructure are often overlooked. Another manifestation of sprawl is an increase in vehicle ownership. This is reflected in the Boston region, where vehicle ownership has been growing five times faster than the population. A third consequence of sprawl is increased driving, since destinations are farther apart and less apt to be connected by public transit. Vehicle miles traveled in the greater Boston area have increased 14% over the decade. More vehicles and an increase in miles traveled have resulted in a 52% increase in congestion in the region.

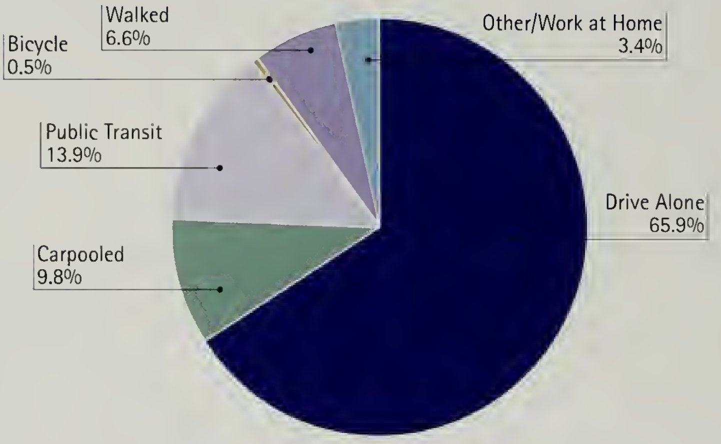
Although automobile ownership and miles traveled are increasing at rates that far exceed population growth, the data also show that commuters are increasingly choosing public transportation, which is a positive sign for the region. Further expansion of the regional transit network is planned, and trends in ridership and parking seem to indicate that the use of transit is constrained only by the available supply. And although there is no comparable information on increases in walking and bicycling, demand for non-motorized facilities is increasing and plans for new bicycle trails, sidewalks, and pedestrian crossings are being incorporated into many new roadway designs.

All recent trends suggest that the demand for travel in the region is growing. Whether this travel takes place by auto, transit, or walking will largely depend on the land use patterns we choose in the coming years. MAPC emphasizes the critical role of concentrated development and encourages the use of alternative modes of transportation in order to minimize the impacts of growth on the environment, improve and maintain our air quality, reduce ozone depletion, and relieve congestion on our roadways.

MODES OF TRANSPORTATION

Chart 6-1 shows how popular different modes of transportation are to commuters in the region. As these data are not yet available from the 2000 Census, we must rely on the 1990 results. Although outdated, these data provide an indication of the overall trends in transportation as well as a benchmark by which to measure the 2000 results when they are released.

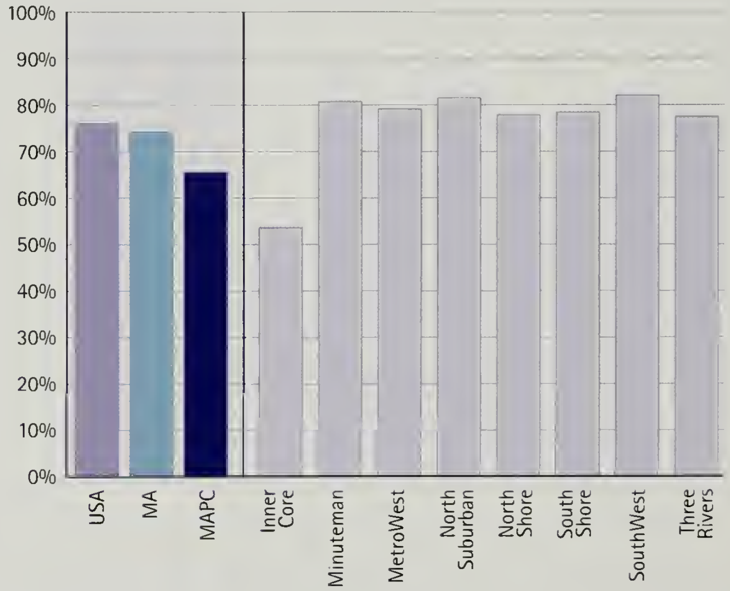
Chart 6-1: Transportation Mode Share in the MAPC Region, 1990



Source: U.S. Census Bureau

At 65%, driving alone is by far the most common means of transportation for residents in the region. This percentage is lower than state or national figures. Similarly, public transportation and walking were more common modes of transportation in the region than in the state or the nation. This is because increased density lends itself to an increase in public transportation availability and usage and other means of transportation such as biking and walking. Simply put, people living in and around large activity centers generally have shorter distances to travel and more transportation options available to them.

Chart 6-2: Percent Employed Persons 16 and Over Who Drove Alone to Work, USA, MA MAPC Region, and Subregions, 1990



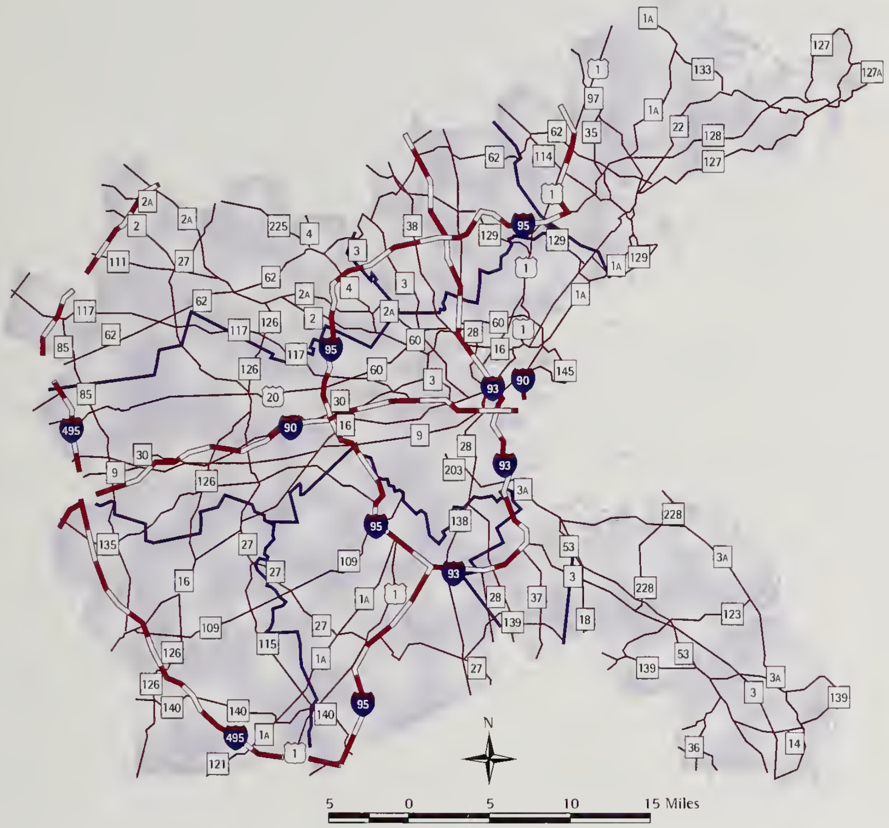
Source: U.S. Census Bureou

Inner Core residents are far less likely to drive alone to work than residents in surrounding subregions (see Chart 6-2). Again, this is largely due to greater access to public transit in the Inner Core and, to a lesser extent, the ability to walk or bike to work. The chart also shows that all subregions outside of the Inner Core exceed both the state and national percentage of people who drive to work alone. While a few suburban travelers may have switched to the expanded commuter rail services in the 1990s, large increases in vehicle ownership, miles traveled, and congestion suggest that many commuters still have limited transportation choices or chose not to use existing alternatives.

REGIONAL ROADWAYS

According to MassHighway, regional roadways include 1,148 miles of interstate highways; 5,128 miles of arterials; 2,812 miles of collector roads; and 14,032 miles of local streets. Map 6-1 highlights the major roads in the region. Currently, the regional transportation system is based primarily on a radial design. That is, most roads and transit networks go into and come out of Boston, which serves as a hub. Despite the fact that throughout the 1990s commercial and residential development patterns have shifted the emphasis from the city to the suburbs and spawned more suburb-to-suburb commutes, our major roadways have essentially maintained their radial design. Although Routes 128 and I-495 connect suburban communities to some extent, many feel there is a need for increased inter-community access. Increased transportation capacity from suburb to suburb should emphasize alternative transportation modes such as bike paths and public transit, when feasible.

Map 6-1 Major Roadways in the MAPC Region, 2000



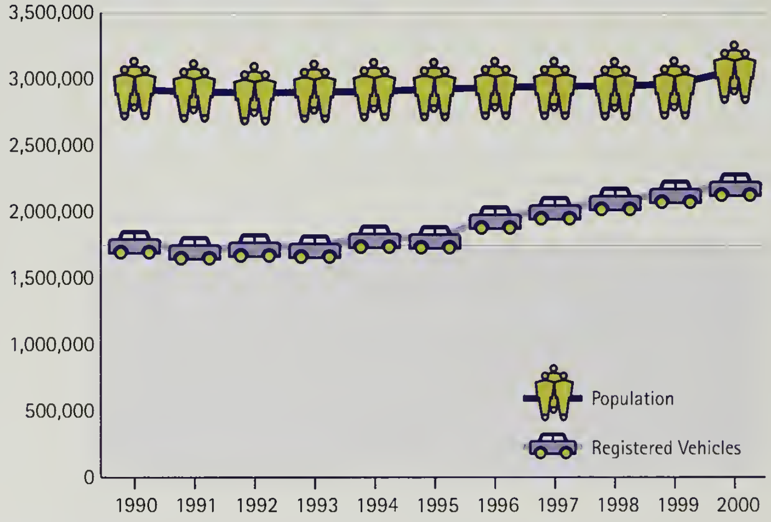
Source: MA Highway Department

...the number of registered vehicles has increased at a faster pace than the population, particularly after 1995.

PERSONAL VEHICLE USE

Chart 6-3 shows that the number of registered vehicles has increased at a faster pace than the population, particularly after 1995. While the total population grew by 4.9% over the decade (and the number of people of driving age increased by 2.7%), annual vehicle registrations soared by 25.6%.

Chart 6-3: Number of Registered Vehicles and Population Growth, MAPC Region, 1990-2000



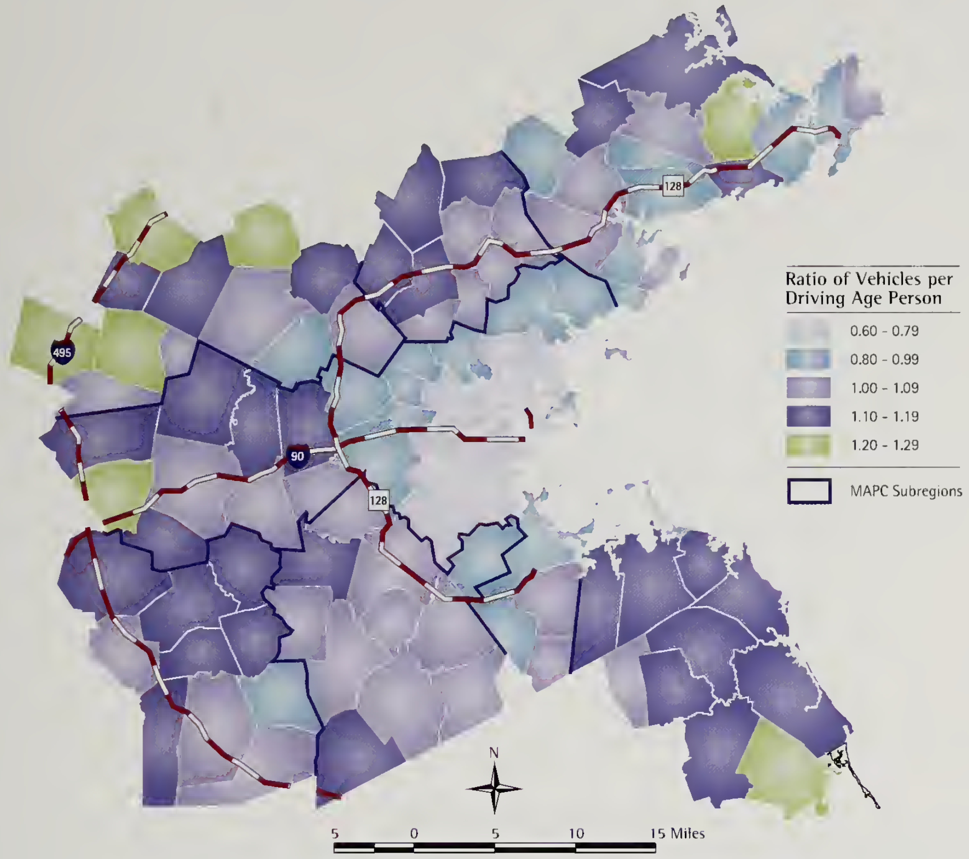
Source: MA Department of Motor Vehicles; U.S. Census Bureau

How does number of personal vehicles vary in the region?

Overall, the MAPC region has slightly fewer vehicles per driving age person than the state. This is primarily due to greater access to public transit in the Boston area.

Map 6-2 illustrates a clear distinction between the Inner Core and surrounding communities in terms of vehicle ownership. Communities with the highest vehicle ownership per driving age person are scattered toward the periphery of the region, while Inner Core communities occupy the top nine slots for fewest vehicles per driving age person. This supports the premise that concentrated development, which allows for greater access to public transportation, reduces the need for an automobile. Another contributing factor, however, is affordability, as communities with high vehicle ownership also tend to have high median incomes.

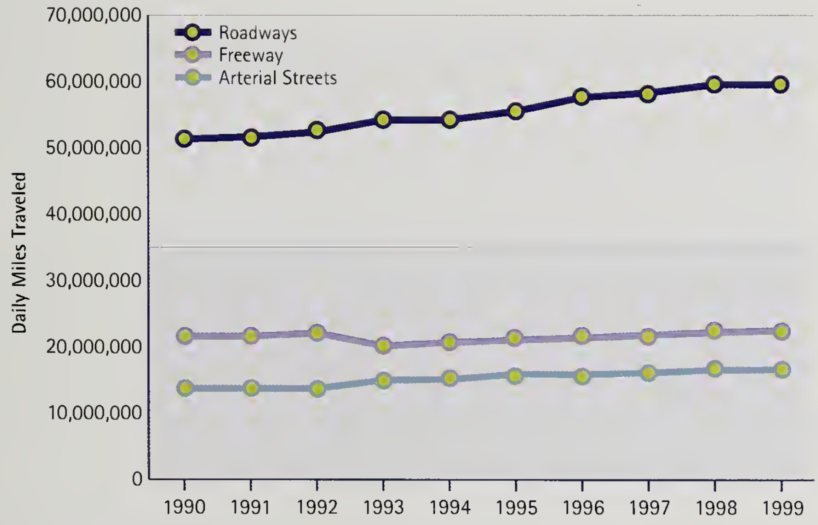
Map 6-2: Registered Vehicles per Person 16 Years Old and Over by Community, 2000



Source: U.S. Census Bureau; MA Registry of Motor Vehicles

How have vehicle miles traveled (VMT) changed?

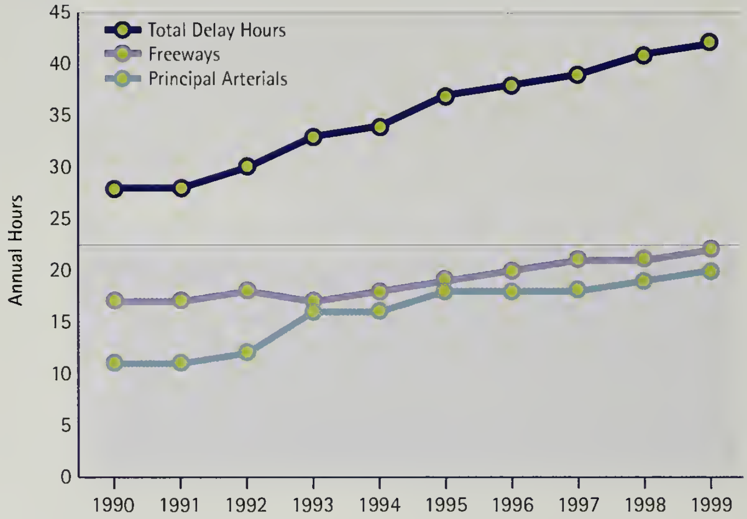
Chart 6-4: Vehicle Miles Traveled in the Boston Urban Area by Road Type, 1990 – 1999



Source: Texas Transportation Institute; Texas A&M

Chart 6-4 shows that vehicle miles driven per year have increased over the decade, by 13.8% from 1990 to 1999.[28] Three intrinsically interrelated factors – employment growth, population growth, and roadway expansion – contributed to this increase. VMT have increased faster on arterials than on freeways, most likely due to the fact that freeways were already experiencing congestion prior to 1990.

Chart 6-5 Annual Per Capita Delay Hours in the Boston Urban Area, 1990-1999



Source: Texas Transpartation Institute; Texas A&M

Has increased VMT been accompanied by increased congestion?

More vehicles traveling more miles inevitably leads to increased congestion. In the region, total annual delay hours on freeways and arterials increased by 52% over the decade. Chart 6-5 demonstrates that by 1999, a driver in Boston's urban area spent an average of 42 hours annually stuck in traffic. The chart also breaks down the number of those hours that were spent on the freeways and principal arterials. It shows that although the freeways have consistently been more congested, the gap between the two has narrowed significantly, as arterial delay hours increased at more than twice the rate of freeway delay hours.

When roadways are operating at or near capacity, even a small increase in travel can have serious consequences for congestion. This has certainly been the case in the region, where delay hours increased at almost four times the rate of vehicle miles traveled.

CRASHES

Crash statistics provide one measure of user safety, and fatalities are the most severe consequences of unsafe operations. With the highest number of residents and commuters, Boston is also the location of the greatest number of fatal automobile crashes. However, its share of crashes is proportionate to its population. Boston is home to 20% of the region's population and was the location of 19% of the region's fatal crashes between 1990 and 1999.

Map 6-3 shows the number of fatal crashes per 10,000 people by community, thus indicating which cities and towns have a disproportionately high number of fatal accidents. The map illustrates that many of the communities with a high number of fatal accidents relative to their population size are those that have experienced fast-paced growth over the decade, including Hopkinton, Southborough, and Boxborough.

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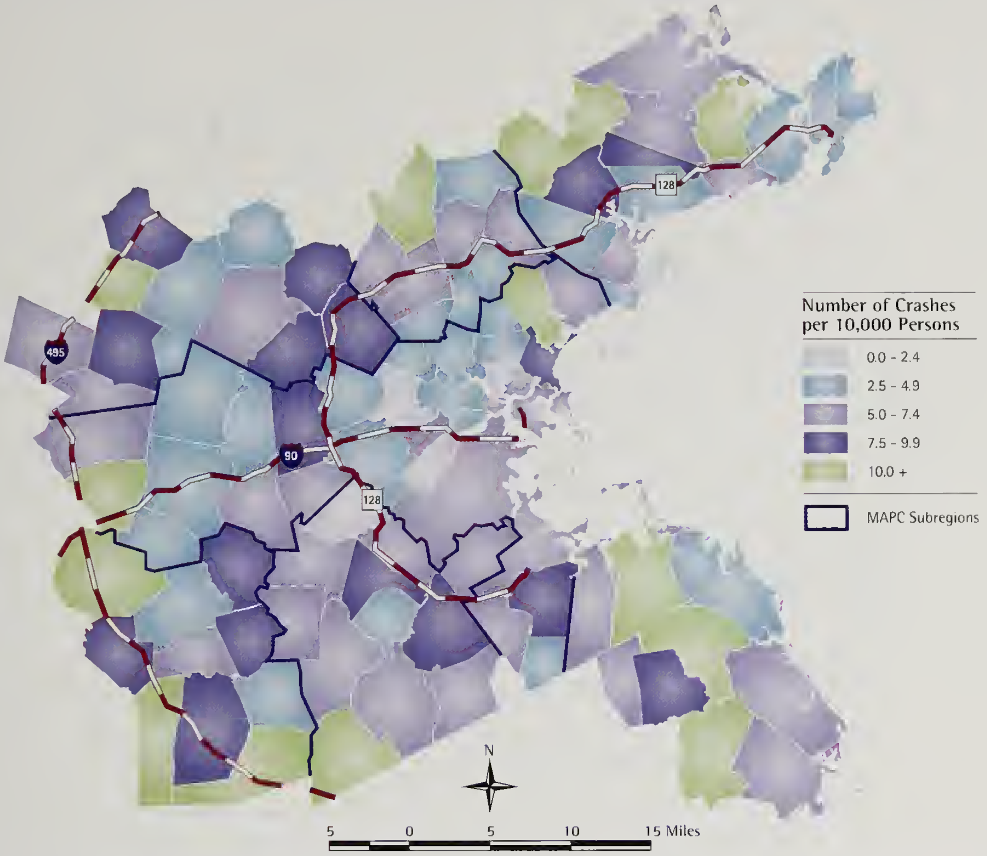
[28] VMT and congestion data was provided for the Boston Urbanized Area. This is a Census-designated geographical area, and, except for small portions in Billerica, Tewksbury, and Hanson, its boundaries fall within the MAPC region.

Map 6-3: Number of Fatal Automobile Crashes per 10,000 Persons by Community, 1990-1999



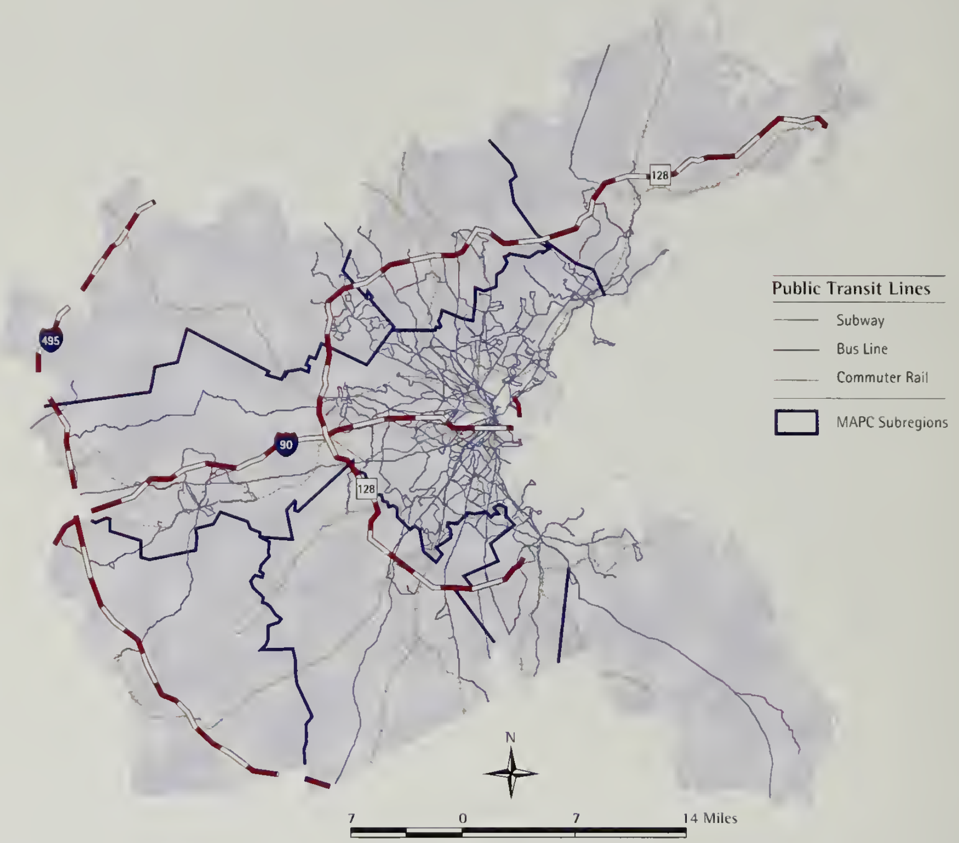
Source: MA Highway Department; U.S. Census Bureau

ALTERNATIVE TRANSPORTATION

Eastern Massachusetts offers a variety of transportation options that extend beyond personal use vehicles, particularly in the greater Boston area. The Massachusetts Bay Transit Authority (MBTA) runs subway, trolley, bus, commuter rail, and ferry services via an interconnected, multi-modal network. The service area includes 175 cities and towns in the eastern and central parts of the state, and riders make 1.2 million trips a day on the system. The Cape Ann Transportation Authority provides bus service to Gloucester, Rockport, and all of Cape Ann. In addition, there are numerous transit lines throughout the region that are run by municipalities and private contractors. Map 6-4 shows all public transit lines currently operating in the region. As with the roadway network, the radial orientation to downtown Boston, particularly for commuter rail, is apparent.

Aside from motor vehicles, biking and walking remain popular transportation options for people who live in concentrated areas of the region.

Map 6-4: MAPC Regional Public Transportation System, 2000



Source: Moakley Center; Metropolitan Area Planning Council; Massachusetts Bay Transportation Authority

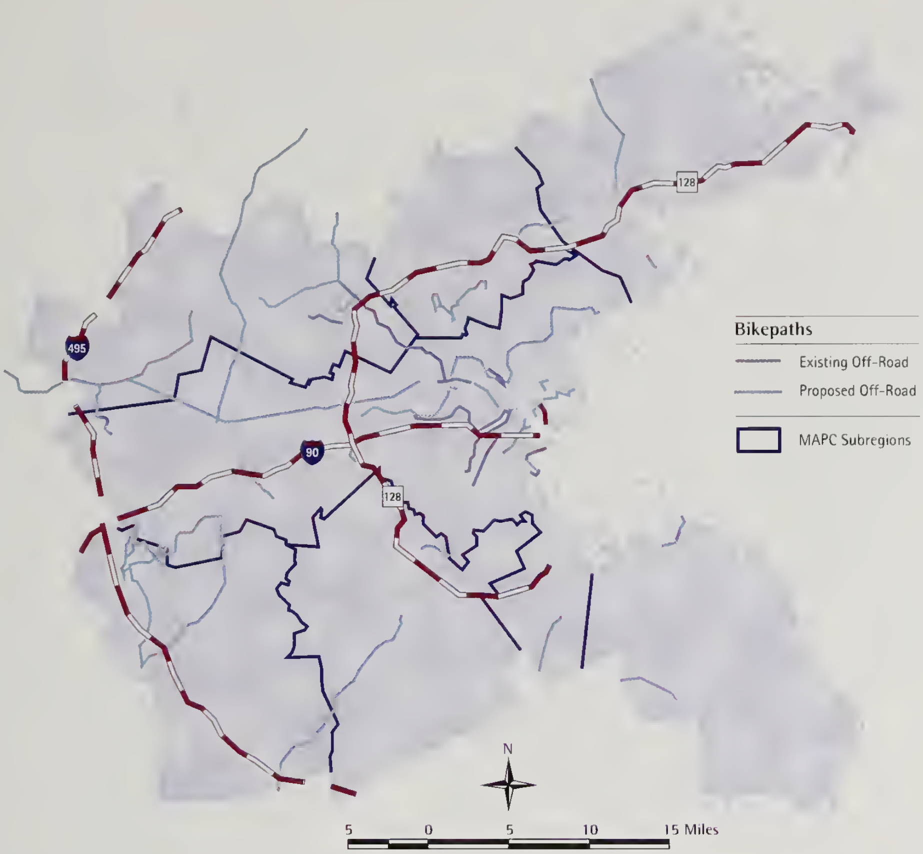
Where are bicycle designated areas located in the region?

Aside from motor vehicles, biking and walking remain popular transportation options (in addition to being popular recreational options) for people who live in concentrated areas of the region. Map 6-5 is a working draft of the region's existing and proposed off-road bike trails. According to current data, there are 50 miles of existing off-road bike trails in the region, as well as an additional 242 miles that are proposed.

...there are 50 miles of existing off-road bike trails in the region, as well as an additional 242 miles that are proposed.

Photo: MassBike

Map 6-5: Existing and Proposed Off-Road Bike Paths in the MAPC Region, 2000



Source: MAPC; Central Transportation Planning Staff

Is public transit accessible to residents?

Map 6-6 and 6-7 show population and employment density by Transportation Analysis Zone (TAZ) and demonstrate where public transportation lines and stops lie in relationship to people and jobs.[29] The commuter rail and subway stations are indicated by dots, which are encircled in a 1/2 mile buffer. The general assumption is that people will walk to a public transit facility if it lies within 1/2 mile of where they live or work. The bus lines were not buffered due to their extensive coverage.

Photo: Lori DiSantis, MBTA

Eastern Massachusetts offers a variety of transportation options that extend beyond personal use vehicles, particularly in the greater Boston area.

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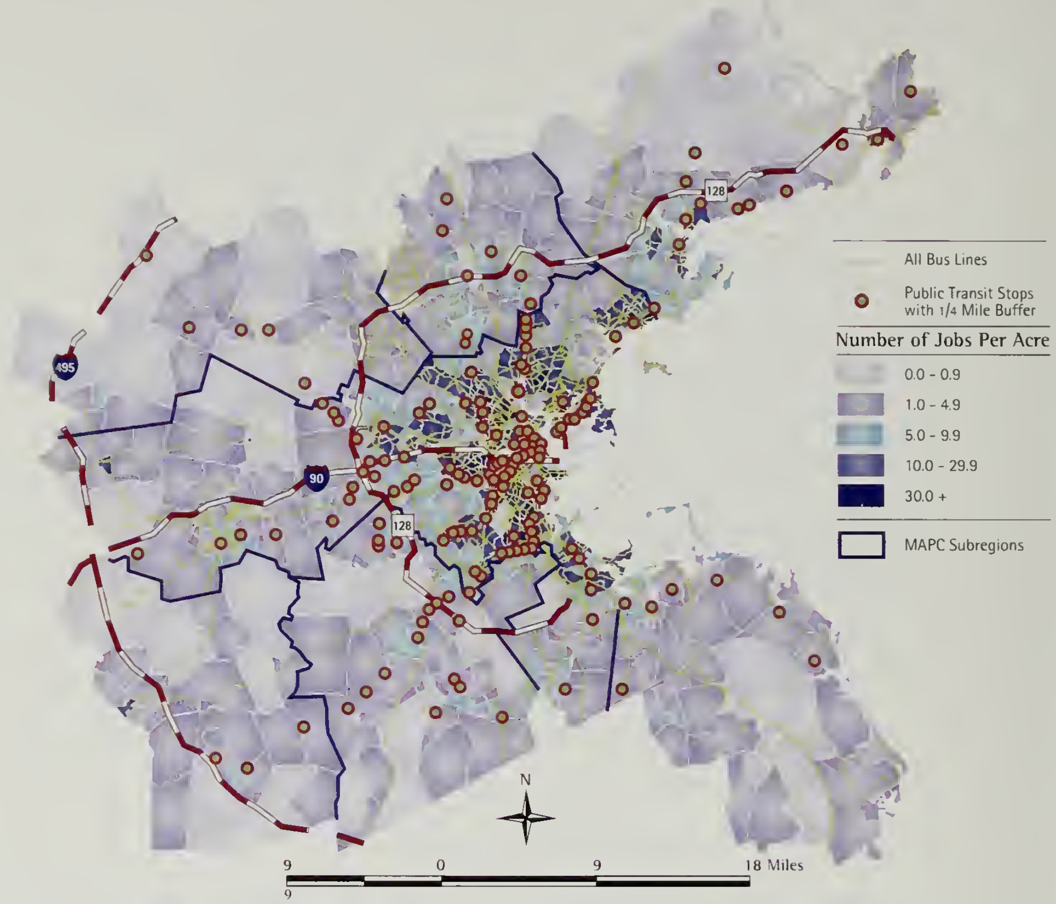
[29] A TAZ is a small geographic area based on U.S. Census boundaries. Data by TAZ are commonly used in the modeling of regional transportation demand.

Map 6-6: Population Proximity to Public Transit, 2000

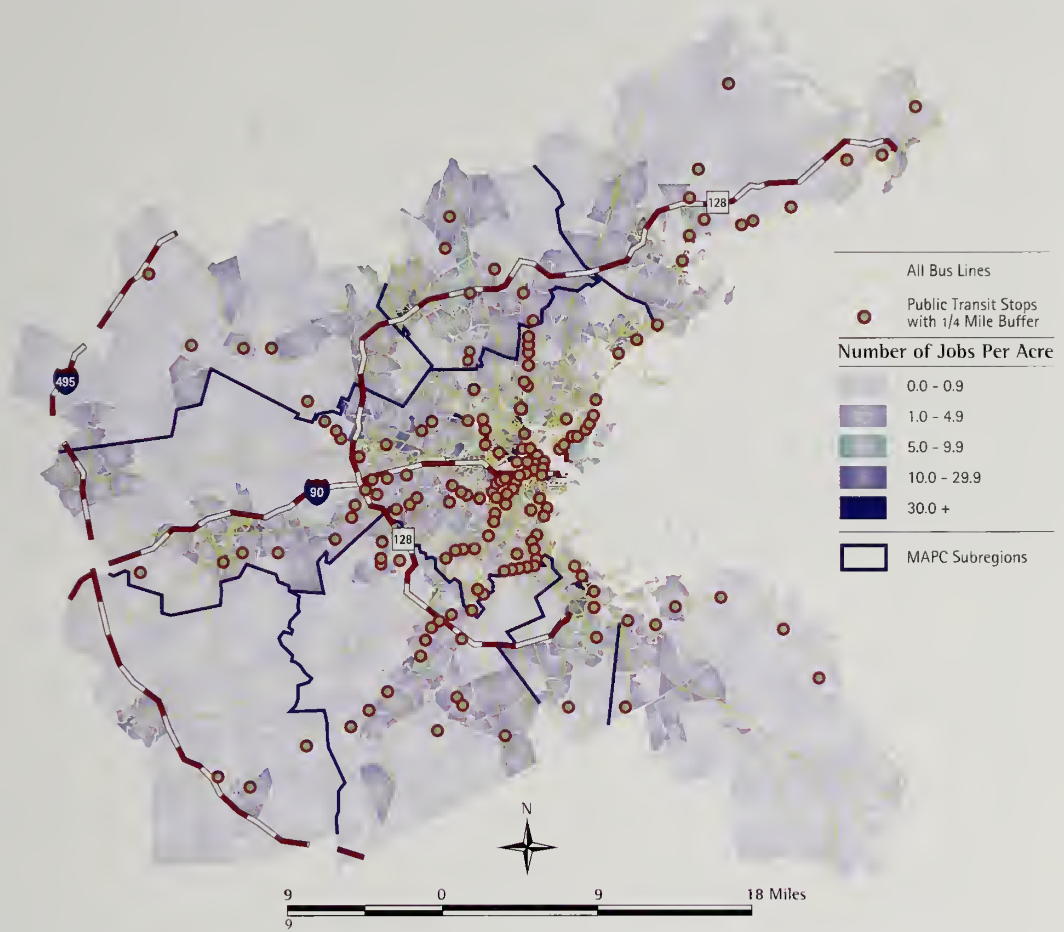


Source: Metropolitan Area Planning Council; Central Transportation Planning Staff; Moakley Center

The maps show that the most densely settled areas in terms of population and employment in the region tend to correspond with public transit. Not only do people tend to move near transit, transit lines often move to people. That is, in many instances bus and commuter rail service providers have responded to high growth areas by expanding service. These maps also show that sparsely populated areas are generally not served by public transit. Residents in these areas must depend on personal use vehicles for their primary source of transportation. The maps also highlight scattered pockets of high density that may be prime targets for future expansion of public transit service.

Not only do people tend to move near transit, transit lines often move to people.

Map 6-7: Employment Proximity to Public Transit, 2000



Source for Map 6-6 and 6-7: Metropolitan Area Planning Council; Central Transportation Planning Staff; Moakley Center

Is commuter rail usage high?

Many commuters chose to drive to rail stations and use public transit. Therefore, the occupancy of park-and-ride lots is an indication of the level of commuter rail and subway ridership.

Table 6-1 shows that in 2000, most park-and-ride lots were full on an average weekday. The Newburyport/Rockport and Providence/Stoughton lines brought down the overall percent usage of park-and-ride lots for the commuter rail. The Newbury/Rockport line had low usage in 2000 partly due to a new Ipswich to Newburyport segment which had not yet reached anticipated demand and partly due to poor access to the Lynn parking garage. Low usage figures on the Providence/Stoughton line were due to construction at the Route 128 lots at University Avenue. Subway park-and-ride lot data show the Orange and Red lines essentially full to capacity, with the Green line close behind. The Mattapan-Ashmont line's 298 spaces were not used to capacity because most users walk to the stations and because the parking is not easily accessible from Route 128 or the Southeast Expressway.

The fact that the majority of lots were over 90% full every day suggests that ridership of public transit is generally high and might increase if there were more parking spots available.

Table 6-1: Park and Ride Lot Usage, 2000

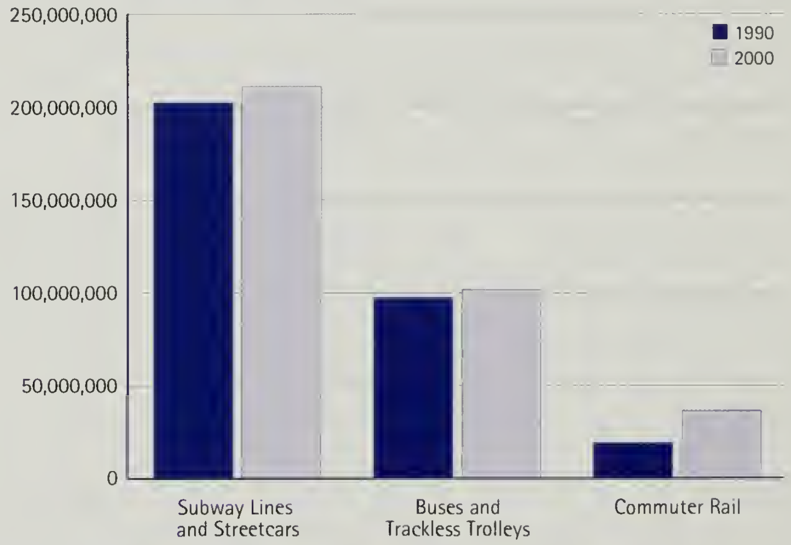
Transit Line	Total Spaces	Percent Usage
Newburyport/Rockport	3,843	65.7%
Haverhill	2,353	86.9%
Lowell	1,891	93.9%
Fitchburg	1,545	91.1%
Worcester	2,572	91.0%
Needham	1,425	90.2%
Franklin	3,637	95.4%
Providence/Stoughton	8,066	69.0%
Fairmount	52	90.4%
Middleboro	2,962	79.8%
Kingston/Plymouth	3,126	91.0%
Commuter Rail Total	*31,472*	*81.6%*
Blue Line	3,922	89.4%
Green Line	1,930	95.1%
Orange Line	5,442	100.1%
Red Line	6,468	99.5%
Mattapan-Ashmont	298	42.3%
Rapid Transit Total	*18,060*	*96.1%*

Source: Central Transportation Planning Staff

How has public transit use changed in Boston?

Chart 6-6 shows that ridership on all modes of public transit has increased throughout the decade. Subway and bus ridership has increased at a rate slightly slower than the overall population, by 4.3% and 4.4% respectively. Both were already at their capacity during peak hours, leaving little room for growth without expanded service. Subway lines service the largest number of passengers daily, almost six times the number served by commuter rail and twice those served by buses and trackless trolleys. Commuter rail ridership grew the fastest over the decade, increasing by 90%. Explanations include increased usage of existing lines, as well as extended service out to Kingston/Plymouth, Middleborough/Lakeville, Newburyport, and Worcester.

Chart 6-6: Increase in Ridership of Public Transit Boston Metropolitan Area, 1990-2000



Source: Federal Transit Administration

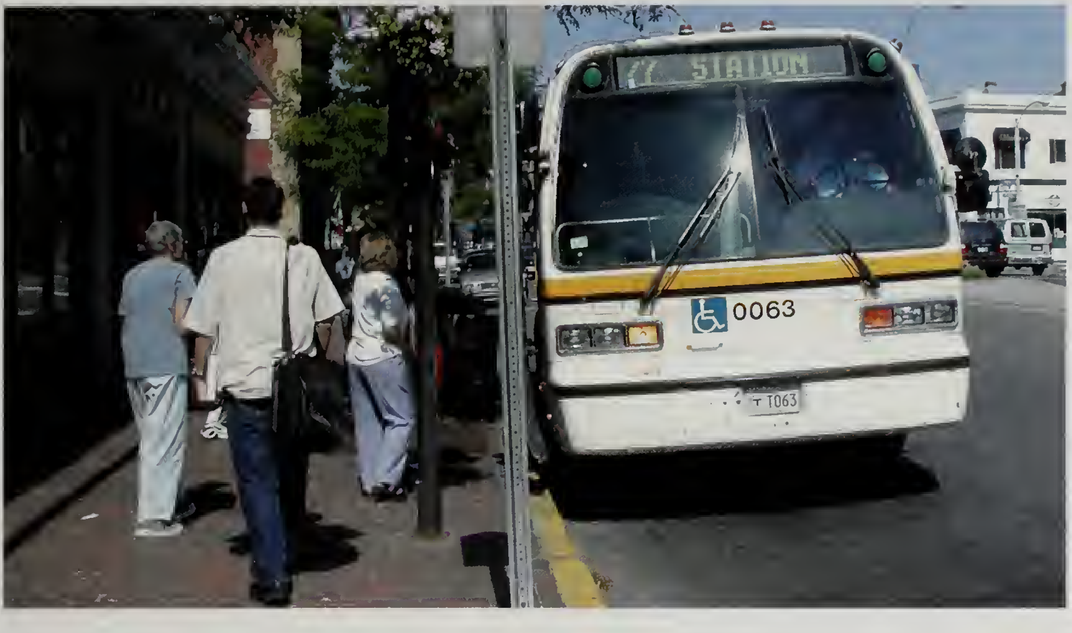


Photo: Lori DiSantis, MBTA

Recognition of the link between land use and transportation is key to balancing our future needs for transportation, economic development, and quality of life.

THE CHALLENGES AHEAD

As the region's more suburban and rural areas grow and development patterns become more decentralized and dispersed, transportation challenges increase. Suburb-to-suburb commutes are changing the paradigm from a core-centered, radial transportation system and making it harder to meet transportation demand through public transportation. One challenge is to manage growth in ways that make the most efficient use of our existing transportation infrastructure and promote transit and other alternatives to single-occupant auto travel. A related challenge is to satisfy the growing demand for travel with the least negative impact on congestion, mobility, and the environment. Recognition of the link between land use and transportation is key to balancing our future needs for transportation, economic development, and quality of life.

SECTION SEVEN: ENVIRONMENTAL RESOURCES

The metropolitan Boston region offers residents a wealth of natural resources, which include miles of sandy beaches, lush parks, wooded forests, roaming wildlife, hiking, biking and walking trails, and vast water supplies. These resources are being compromised and depleted daily, however, as growth patterns continue outward of city and town centers. This effect can be seen through environment-related trends in the region. This section looks briefly at land use, water use, air quality, and toxic release indicators, and how trends have changed throughout the 1990s.

Land use data indicate that poorly planned development continues to be a serious threat to the quality and quantity of natural resources in the MAPC region. Undeveloped land was lost to residential development throughout the decade, as an average of 7.6 acres was developed per day between 1991 and 1999. Yet MAPC's buildout analyses identified a significant remaining capacity for both residential and commercial/industrial growth, particularly in the Inner Core, SouthWest, and North Shore subregions. The Inner Core will see most of its new growth as infill and redevelopment of existing properties. Conversely, growth in the SouthWest and North Shore subregions is likely to occur through the subdivision and conversion of open space. As widespread low-density, resource intensive growth – large-lot residential, campus-style office parks, and sprawling malls – faces rural communities along I-495 and north and south of Boston, it becomes increasingly important to plan proactively and protect sensitive natural resources.

Water usage data show that although the 38 communities associated with the MWRA water system are well below withdrawal limits set under the Water Management Act (WMA), several communities outside of the system are nearing, at, or over their permitted limits. During the arid summer months of 1999, nearly half of MAPC communities declared water supply emergencies. Unless meaningful water management measures are adopted, the growth that is anticipated by the buildout analyses will severely tax both local and regional water supplies. Moreover, communities may need to invest in costly filtration facilities if poor land use practices continue to contaminate existing sources.

A look at air quality in the region indicates that efforts on the part of area businesses, civic organizations, and officials over the past decade have resulted in a steady decrease in the number of days per year that Boston's air quality rated as unhealthy. However, more needs to be done, especially in the more urban areas. In 1999, the air monitoring stations positioned in Chelsea, Lynn, Waltham, Boston's Long Island, and Boston's Harrison Avenue area measured excessive amounts of carbon monoxide (CO). Vehicle exhaust is the major contributor of CO emissions in urban areas. Toxic release trends provide evidence that headway has also been made in the realm of curbing undesirable toxic emissions. Data show that toxic releases in the metropolitan area have declined over the last decade.

As our region continues to grow, more demands are placed on limited land and water resources. The impacts of development and population growth can have far-reaching consequences for air and water quality. The negative effects of growth, particularly when associated with disproportionately high resource and land consumption, can be tempered through the thoughtful application of sound planning techniques and regulatory controls. To some extent, land acquisition and regulatory controls instituted during the past several decades have resulted in the preservation of sensitive natural and cultural resources. However, a great deal more needs to be done to preserve the character of the region and achieve sustainability.

LAND

Table 7-1 presents land use changes in the region between 1991 and 1999.[30] The data show number of acres by land use category: undeveloped, single-family residential, multi-family residential, and commercial or industrial use. Undeveloped land includes forestry, agricultural, wetlands, and open space.

Table 7-1: Land Use Changes in the MAPC Region by Acreage, 1991 and 1999

Year	Undeveloped		Single-Family		Multi-Family		Commercial/Industrial	
	Total Acres	% of Land	Total Acres	% of Land	Total Acres	% of Land	Total Acres	% of Land
1991	547,003	59.6%	281,640	30.5%	18,845	2.1%	71,443	7.8%
1999	524,713	57.1%	300,879	32.7%	19,576	2.1%	73,734	8.0%
Difference	-22,290	-2.5%	19,239	2.2%	731	0.1%	2,291	0.2%

Source: MassGIS

Approximately 57% of the region's total acreage remained undeveloped in 1999. Much of this land is unlikely to be developed: state and federally owned forests and parks, for example, are protected from development by law, and wetlands and certain open spaces are not suitable for development. The remainder of developable land, however, is quickly being converted, particularly for single-family development. Table 7-1 shows that in the eight-year period from 1991and 1999, the region lost 22,290 acres of undeveloped land. This amounts to an average loss of 7.6 acres of undeveloped land per day. The overwhelming amount (86%) was developed for single-family housing. By 1999, a third of the land in the region was occupied by single-family homes.

How does land use vary between subregions?

There are significant differences in land use by subregion, as shown in Chart 7-1.

Chart 7-1 highlights the contrast in land use among subregions. This difference is most apparent when comparing the Inner Core and the SouthWest subregion. The Inner Core has the lowest percentage of undeveloped land and the highest multi-family and commercial and industrial development, which is typical of an urban core. Conversely, the SouthWest subregion has the

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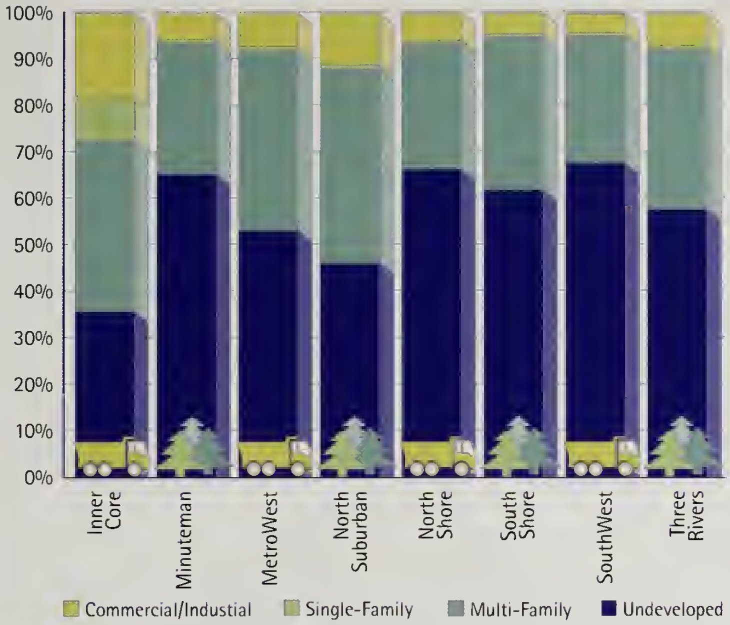
[30] This UMass/MassGIS data set was collected for the following years: 1971, 1985, 1991, and 1999. Therefore, data that span a full decade (1990 to 2000) are not available.

Chart 7-1: Land Use in the MAPC Subregion by Acre, 1999



Source: MassGIS

highest percentage of undeveloped land and the lowest percentage of multi-family and commercial and industrial use in the region. At 41%, the North Suburban subregion stands out as having the highest percentage of land used for single-family residences. And with nearly 85,000 undeveloped acres, the North Shore subregion has the highest number of undeveloped acres.

How much more development will occur in the subregions?

Using MAPC's buildout analysis methodology, estimates were generated to forecast the approximate number of additional dwelling units and commercial and industrial floor area that could be built on developable land in each community under existing zoning regulations. Those figures were used to further calculate information about the additional residents, students, water usage, solid waste, and miles of roadway resulting from this growth. The purpose was to help communities see what was ahead so they could improve planning and better manage growth. Each subregion's share of the total regional building potential under present zoning is presented in charts 7-2 through 7-5.[31]

As our region continues to grow, more demands are placed on limited land and water resources.

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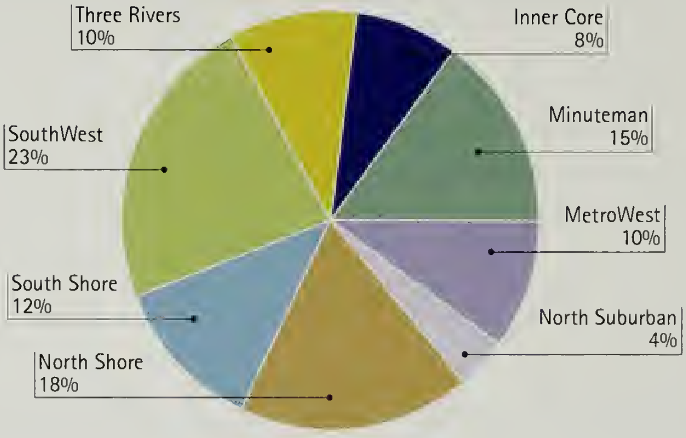
[31] A buildout analysis for Boston has not yet been completed, and therefore all data for the Inner Core subregion exclude the City of Boston.

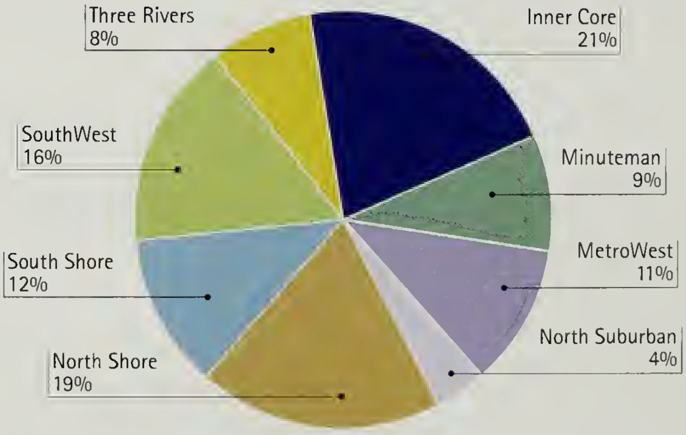
These charts tell a story about the development potential of the region. Although the Inner Core has little developable land in comparison to other areas, it has comparatively high capacity for residential, commercial, and industrial growth because regulations in many Inner Core communities allow for higher density, more concentrated development. Conversely, the SouthWest subregion has nearly a quarter of all developable land in the region, yet is expected to see only about a sixth of the region's allowable dwelling units. This is because SouthWest communities' zoning and density regulations permit little multi-family construction and require larger lot sizes than the Inner Core. The differing impacts of various allowable densities are also shown by the fact that Inner Core communities may see up to 21% of new residential dwellings but only 7% of new lots. Meanwhile, SouthWest communities account for 20% of new lots. These charts also indicate that North Suburban communities are fairly close to being "built out," meaning that they have little available space for new residential, commercial, and industrial development.

Chart 7-2: Subregional Distribution of Potential Developable Land Area, 2001



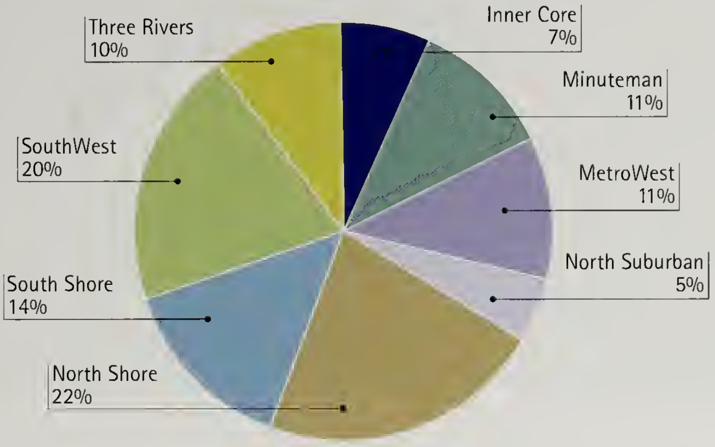
Source: MAPC Buildout Study

Chart 7-3: Subregional Distribution of Remaining Capacity for Additional Dwelling Units, 2001



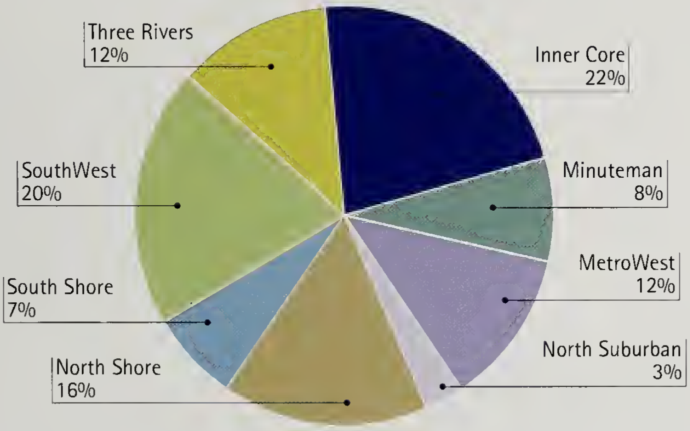
Source: MAPC Buildout Study

Chart 7-4: Subregional Distribution of Remaining Capacity for Additional Residential Lots, 2001



Source: MAPC Buildout Study

Chart 7-5: Subregional Distribution of Available Commercial/Industrial Buildable Floor Area (sq. ft., 2001)



Source: MAPC Buildout Study

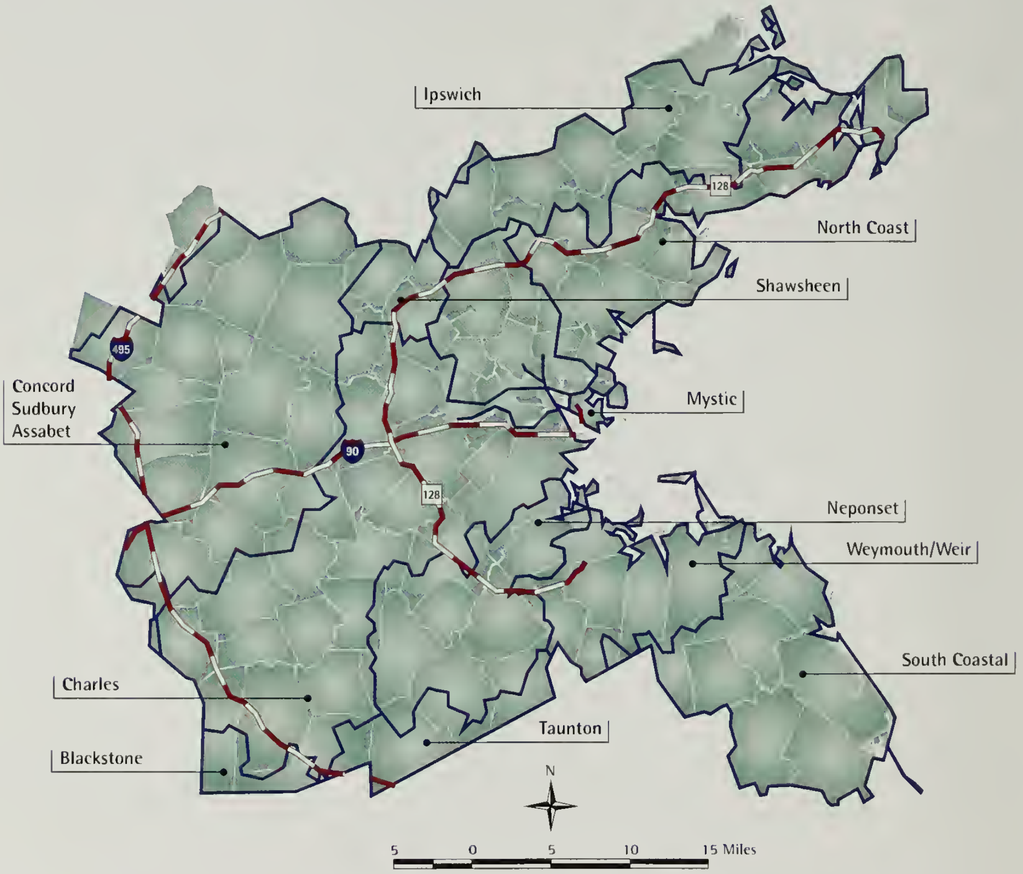
There is an important connection between development and the ability of a community or region to meet economic, social, and ecological needs. Poorly planned residential, commercial, and industrial growth can yield dire consequences. According to buildout projections, more than 2,000 miles of roadway will be needed to link the 168,011 new dwelling units that may be built in the MAPC region. This will be especially burdensome for the largely rural communities of the North Shore and SouthWest subregions, which together have 41% of the region's potentially developable land. Meanwhile, classrooms will be needed to accommodate the region's 13,874 new public school children, and various municipal departments will have to expand to meet an increased demand for services, including emergency services and public works departments. New residents will generate an estimated 37,106 tons of solid waste annually, while approximately 60 million gallons of additional water will be needed each day to service new residential, commercial, and industrial development. The demand for fresh water will become increasingly problematic as development encroaches on remaining open spaces, endangering water quality and quantity.

The causes of continuing poor water quality vary by lake and river basin, but leading causes include failing septic systems, urban stormwater runoff, and in-place contaminated sediments.

WATER

The Massachusetts Watershed Initiative has delineated 27 watersheds statewide, nine of which are within the MAPC region as shown in Map 7-1. The nine are the Boston Harbor watershed (Mystic River, Neponset River, and Weymouth/Weir Rivers), the Blackstone River watershed, the Charles River watershed, the Ipswich River watershed, the North Coastal watershed, the Shawsheen River watershed, the South Coastal watershed, the Sudbury-Assabet-Concord (SuAsCo) watershed, and the Taunton River watershed.

Map 7-1: Watersheds in the MAPC Region

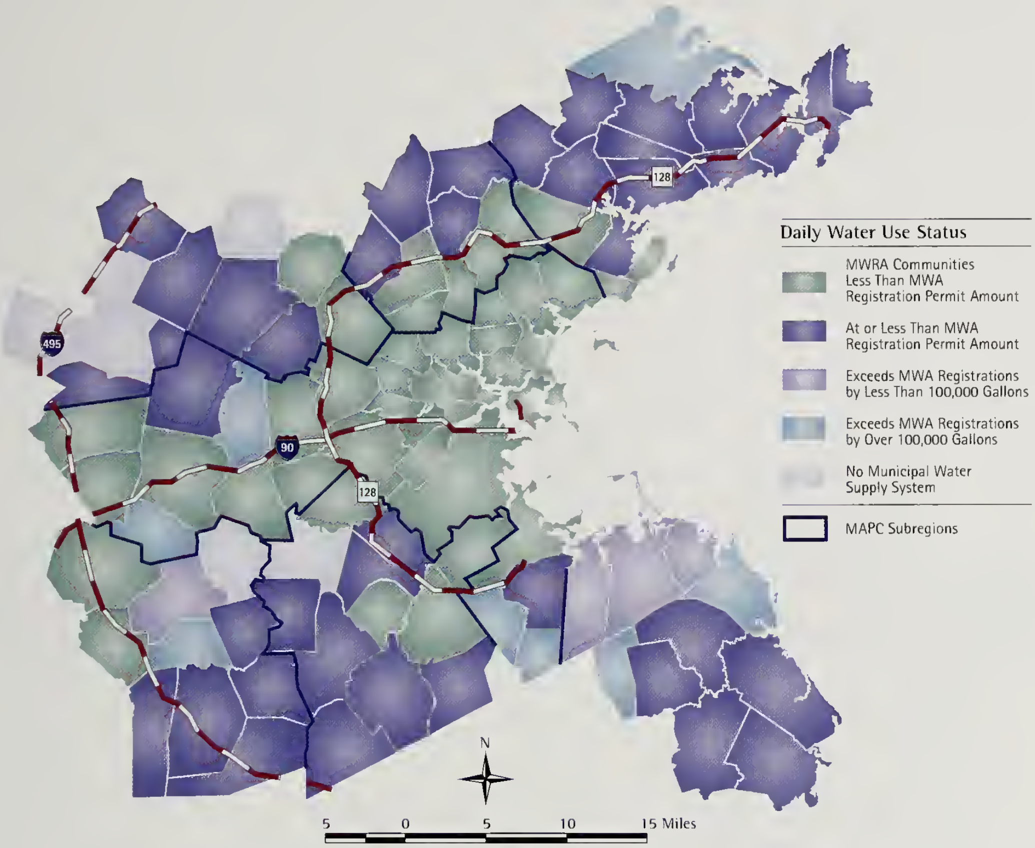


Source: MassGIS

What are the region's sources of water supply?

Public water supplies in the region come from the Massachusetts Water Resources Authority (MWRA) and numerous municipal water departments that pump from local surface and groundwater sources. The MWRA fully supplies 27 communities and partially serves 11. Partial MWRA users supplement their water supplies with local water sources. Cambridge, which is supplied by both MWRA and local sources, uses the largest amount of local water among all partial users, approximately 14 million gallons per day from its surface water reservoirs in the Charles River watershed. Beyond the MWRA water system, 57 communities are entirely supplied by local water sources, which are predominantly groundwater sources. Six communities do not have a municipal water system. The communities that use MWRA water supplies and those without a municipal water system are shown on Map 7-2, which also shows demand (see next section).

Map 7-2: Water Demand and Permitted Withdrawals by Community, 1994 - 1998 Average


128
495
90
128
Daily Water Use Status
MWRA Communities Less Than MWA Registration Permit Amount
At or Less Than MWA Registration Permit Amount
Exceeds MWA Registrations by Less Than 100,000 Gallons
Exceeds MWA Registrations by Over 100,000 Gallons
No Municipal Water Supply System
MAPC Subregions
N
5
0
5
10
15 Miles

Source: MA Department of Environmental Protection, Water Supply Division

What are the trends in regional water demand?

As an overall indicator of the status of the region's water supply systems, recent trends in water demand have been reviewed in the context of the amount of water withdrawal that each water system is currently allowed under the Water Management Act (WMA). The act regulates all withdrawals from surface water or groundwater over 100,000 gallons per day. When the act went into effect in 1985, all public water systems registered their then-current withdrawals (1980-1984). Since then, additional withdrawals have been allowed in many communities through a permitting process. Map 7-2 compares the average daily water use of each community to the total registered and permitted withdrawals under the WMA for each water system.[32]

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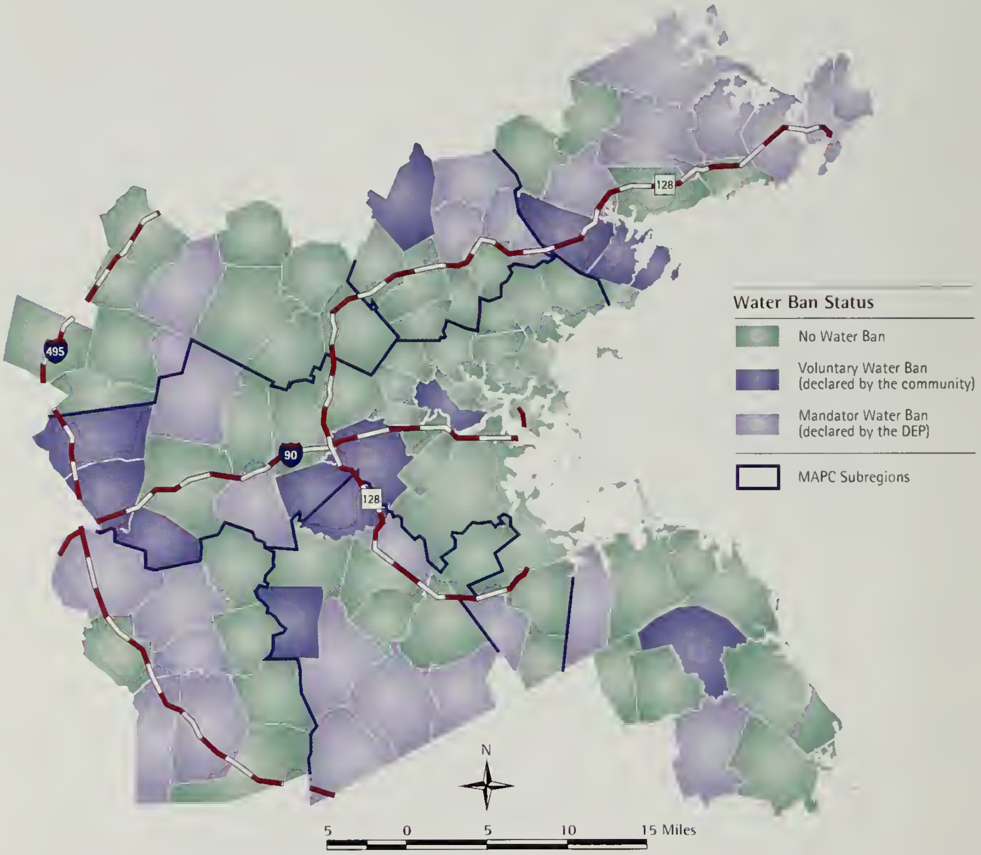
[32] Water use is calculated as an average of the years from 1994 to 1998 in order to account for inconsistencies due to extreme weather patterns and occurrences that may dramatically affect usage from one year to the next.

Map 7-2 shows that the 38 communities served by the MWRA water system are all below the WMA withdrawal limit. Of the 57 non-MWRA municipal water systems, 8 are currently withdrawing water in volumes greater than 100,000 gallons per day above their WMA registrations/permits. Another 5 communities have water withdrawals that exceed their WMA registration by less than 100,000 gallons, which is within the WMA, a criterion for compliance with the Act. Of the 44 non-MWRA communities that have water withdrawals less than their WMA registration/permit, 10 are pumping between 90 and 99 percent of their WMA withdrawal limits. This suggests that demand management measures and/or permit modifications may be needed in the near to mid-future.

It is important to note that this analysis is not based on the safe yield of each community's water sources, which in some cases is greater than the registered and permitted withdrawals under the WMA. That is, some communities with water withdrawals greater than their WMA registration/permit may have water sources and/or infrastructure capacity already in place to meet future water demands beyond their WMA limits. This is particularly relevant in some communities with significant reservoir storage, such as Beverly/Salem, Cohasset, and Milford, among others. However, WMA withdrawal limits are used as a region-wide benchmark in this analysis of supply and demand since reliable safe yield estimates are not available across the whole region. Furthermore, in stressed watersheds the WMA withdrawal limits may be close to the total water available to some towns.

Map 7-3: Communities that have Issued Emergency Water Bans, 1999


128
495
90
128
Water Ban Status
No Water Ban
Voluntary Water Ban (declared by the community)
Mandator Water Ban (declared by the DEP)
MAPC Subregions
N
5
0
5
10
15 Miles

Source: MA Department of Environmental Protection, Water Supply Division

Which areas are affected by water restrictions?

Another indicator of stress on water supply systems is the implementation of emergency water bans. Even if water systems can meet average annual water demands, many have problems meeting the summer peak demands, which can range from 1.5 to 2.5 times higher than the average annual demand. A city or town may declare a voluntary water ban, or it may request that a mandatory water ban be declared by the Department of Environmental Protection (DEP). Under either a voluntary or mandatory emergency, restrictions on outdoor watering are implemented, typically during the peak summer months.

In 1999, 44 communities in the region declared water supply emergencies, 29 of which were mandatory and 15 of which were voluntary. This represents a majority of the 68 communities that rely on local water sources (non-MWRA) for part or all of their supplies. The severity of summer water emergencies is generally proportional to seasonal rainfall patterns, since much of the additional summer water demand is for watering lawns and other outdoor uses. In fact, 1999 was a particularly dry year, which contributed to a larger number of water emergency declarations. In comparison, the year 2000 brought significantly more rainfall, and the number of declared emergencies in the region was 16, of which 11 were mandatory and 5 were voluntary. These trends illustrate the vulnerability of many water systems to stress in periods of lower than average rainfall and suggest that longer term water demand management measures are needed to resolve what has become a chronic problem for many communities.

How is the region's water quality?

Table 7-2 shows that approximately one-third of the region's rivers met water quality standards in 1994. The most seriously stressed was the Mystic River, while the Ipswich was the cleanest. The impairment of river quality is due to a variety of pollution sources, including point source discharges from wastewater treatment facilities and industry, sewer overflows, septic systems, non-point source pollution such as urban stormwater runoff, and contaminated sediments. Risk for pollution is compounded by the multi-community geography of most drinking water watersheds, which requires regional cooperation to ensure protection of water supplies.

Table 7-2: River Quality in the MAPC Region, 1994

	MILES OF RIVER SEGMENTS WHERE WATER QUALITY...			
River Basin	Met Standards	Partially Met Standards	Failed Standards	Total Miles
Blackstone	2.8	2.0	5.1	9.9
Charles	30.0	38.7	22.1	90.8
SuAsCo	20.0	4.7	41.9	66.6
Ipswich	39.9	0.0	0.4	40.3
Mystic	0.0	0.0	18.7	18.7
Neponset	0.0	12.0	15.8	27.8
North Coastal	0.0	2.4	15.0	17.4
South Coastal	7.5	11.3	1.7	20.5
Taunton	0.0	1.5	5.2	6.7
Weymouth/Weir	9.8	2.8	20.6	33.2
MAPC Total	110.0	75.4	146.5	331.9
Percent	33.1%	22.7%	44.1%	100%

Source: MA Department of Environmental Protection

Of the 134 lakes in the region assessed by DEP, quality ratings for two-thirds were reported as poor or severely stressed. The lake classification is based on the aggregate of six indicators of quality, including dissolved oxygen, transparency, phytoplankton, nitrogen, phosphorous, and vegetation. The causes of continuing poor water quality vary by lake and river basin, but leading causes include failing septic systems, urban stormwater runoff, and in-place contaminated sediments.

Table 7-3: Status of Lake Water Quality in the MAPC Region

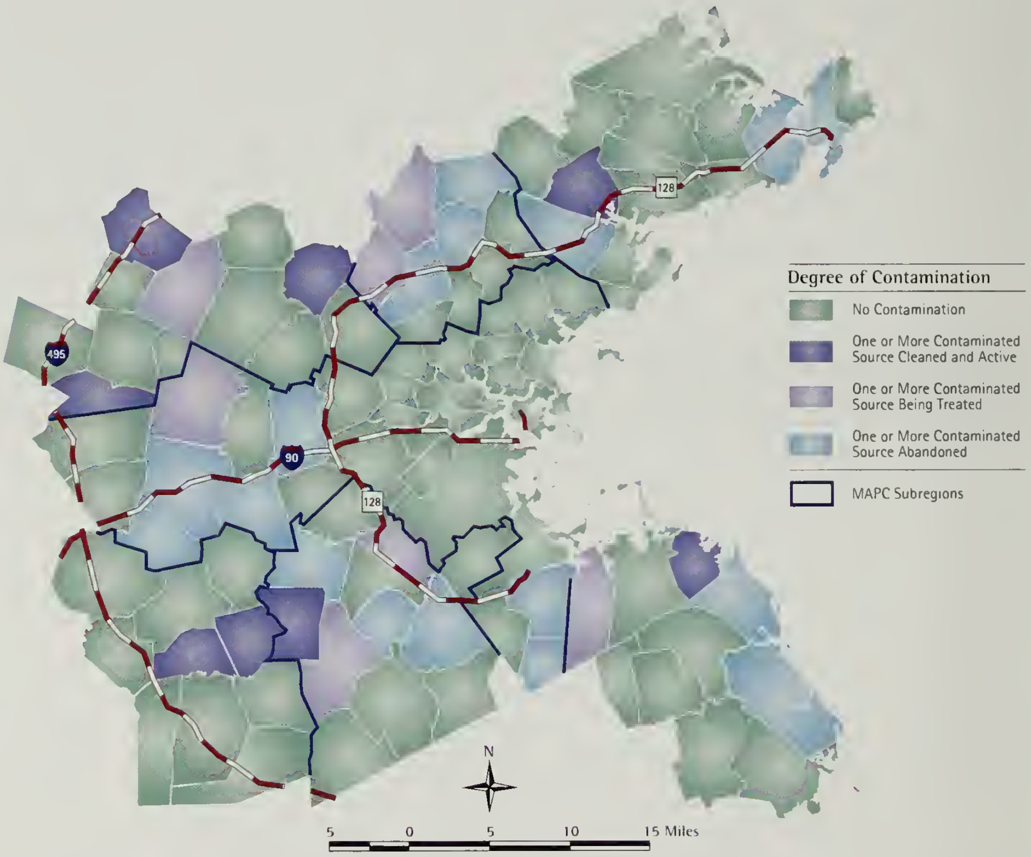
Severity Points	Lake Quality	Number of Lakes	Percent of Lakes
0-4	Good	5	4%
5-8	Fair	37	27%
9-12	Poor	71	53%
13-18	Severe	21	6%
Total Lakes		134	100%

Source: MA Department of Environmentol Protection

Is groundwater and surface water contamination a problem?

Thirty communities in the region have experienced contamination to one or more of their drinking water sources. Map 7-4 indicates which communities have been affected by contamination and illustrates the status of each. Although 11 of these communities have returned formerly contaminated sources to service with treatment, 14 communities had to permanently abandon one or more water source. The total loss in water supply capacity for the region due to contamination amounts to about 25 million gallons per day, which is enough water to serve approximately 333,000 people (over half of the City of Boston).

Map 7-4: Drinking Water Contamination Status of MAPC Communities, 1999


128
495
90
128
Degree of Contamination
No Contamination
One or More Contaminated Source Cleaned and Active
One or More Contaminated Source Being Treated
One or More Contaminated Source Abandoned
MAPC Subregions
N
5
0
5
10
15 Miles

Source: MA Department of Environmentol Protection, Woter Supply Division

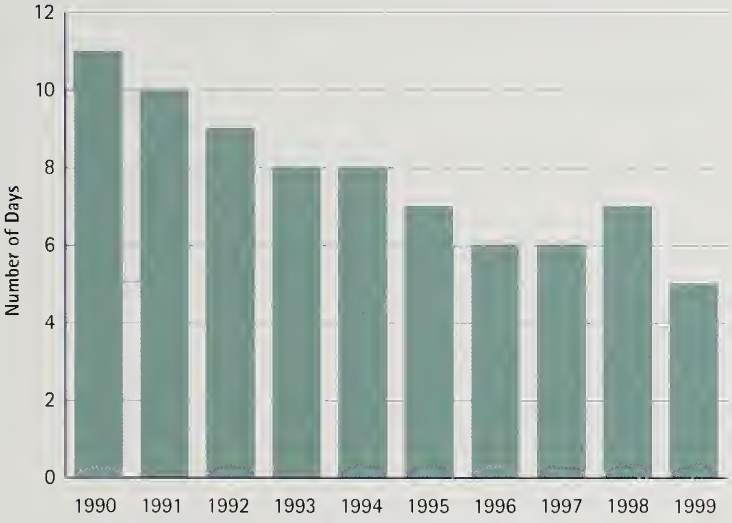
While much progress has been made toward protecting the quality of public drinking water sources in the region, several communities still do not have basic zoning overlay protection measures, and several dozen others have zoning bylaws that were adopted prior to the current standards embodied in DEP regulations.

Overall, air quality has improved in the Boston metropolitan area.

AIR QUALITY

The Air Quality Index (AQI) was created by the U.S. Environmental Protection Agency (EPA) to provide information on the concentrations of five major pollutants: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide.[33] AQI normalizes across pollutants in order to rate the overall air quality. A value of 100 generally corresponds to the national air quality standard for that pollutant, which is set by the EPA to protect public health. An AQI over 100 indicates an unhealthy level of pollutants for sensitive groups such as children, the elderly, and people with asthma or heart disease. The chart below shows the number of days in Boston's metropolitan area that the AQI score has been above 100 from 1990 to 1999.[34]

Chart 7-6 Number of Days Annually that Metropolitan Boston Air Quality Rated "Unhealthy for Sensitive Groups", 1990 – 1999



Source: Environmental Protection Agency, Office of Air Quality Planning and Standards

Chart 7-6 shows that overall, air quality has improved in the Boston metropolitan area. However, in 1999 certain communities still did not attain national air quality standards. Chelsea, Lynn, Waltham, Boston (Long Island), and Boston (Harrison Ave.) had ozone (O3) levels that exceeded national standards. The potential for ozone at the ground level is particularly a concern during

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[33] In 1976, EPA developed the Pollution Standards Index (PSI). In June of 2000, EPA updated the index and renamed it "Air Quality Index" (AQI). AQI and the PSI are similar, except that AQI adds a new health risk category, "unhealthy for sensitive groups," and includes two additional pollutants, ozone averaged for eight hours or more and fine particulate matter.

[34] The number of days that the AQI score has been above 100 are reported in a three-year moving average to avoid skewing the index due to extreme weather, such as particularly hot or cool summers.

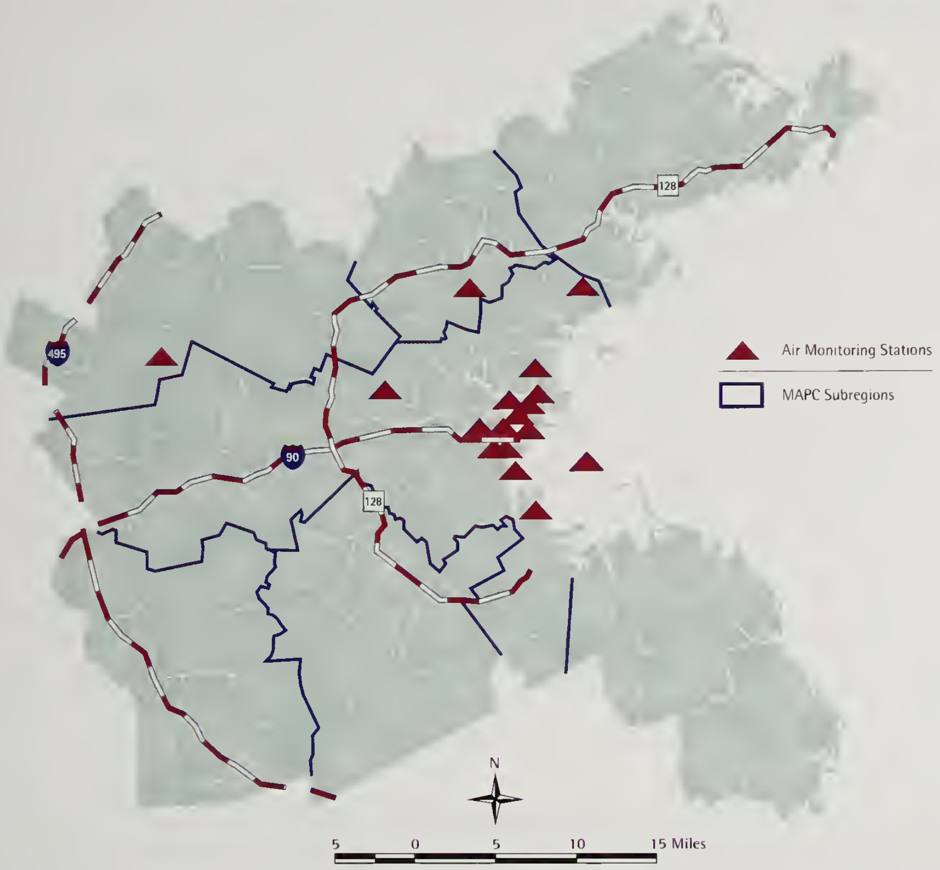
Stresses are evident in our water system, where the challenge of regional cooperation is key to protecting our water supplies.

summer months since it is fueled by hot temperatures. Carbon monoxide (CO) exceeded national standards in Boston (Bremen St.), Boston (Kenmore Square), Chelsea, and Waltham in 1999. Vehicle exhaust can contribute up to 95% of CO emissions in cities and is at highest concentrations in cold weather.

Where is the air quality monitored?

Map 7-5 illustrates the location of monitoring station sites in the metropolitan region. The locations monitor different pollutants and are often located in "hot spots" where high concentrations are expected.

Map 7-5 Air Monitoring Stations in the MAPC Region, 2000



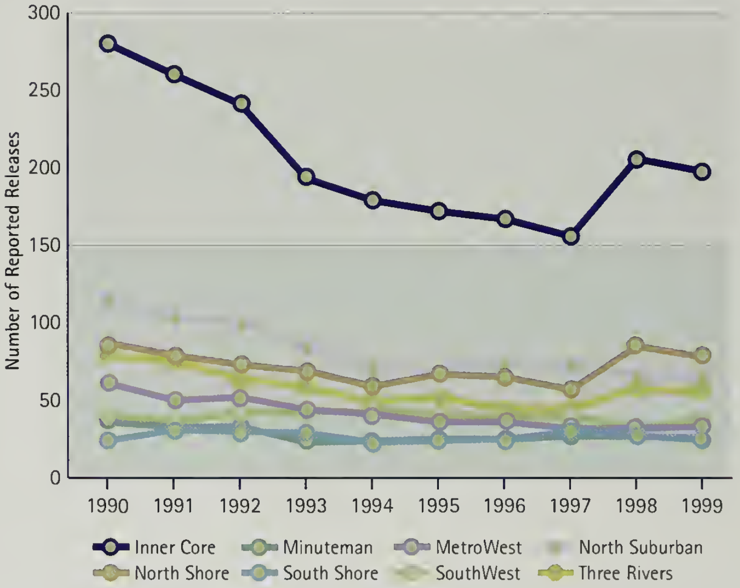
Source: MA Highway Department

TOXIC RELEASES

In an effort to help communities understand more about the chemicals manufactured, transported, and used in their neighborhoods, the EPA created the Toxic Release Inventory (TRI). Created in 1987, the TRI is a database of information about releases and transfers of toxic chemicals from manufacturing facilities. Facilities must report amounts of toxins they release into the air, land, water, and underground injection, and how much they send off-site. Recent scientific studies link toxic chemical exposure to increasing rates of breast cancer and prostate cancer as well as reproductive disorders ranging from birth defects to low sperm counts. The TRI serves three purposes: it aids local governments in responding to chemical emergencies; it is used by the DEP to target prevention and technical assistance outreach efforts; and it informs citizens about the toxic chemicals released in their community.

Toxic releases in the metropolitan area have steadily declined from 1990 to 1997 (see Chart 7-7). The increase in releases in 1998 in the Inner Core, North Shore, and Three Rivers subregions can be attributed to regulatory changes; in 1998, the EPA added seven new industrial sectors, including the utilities industry, to the list of those required to report annual toxic releases to the TRI. Although Massachusetts companies have significantly reduced the use and release of toxic chemicals over the decade, the overall decline in manufacturing facilities during the period accounted for some of the decline in toxic releases.

Chart 7-7: Number of Reported Toxic Releases by Subregion, 1990- 1999



Source: U.S. Environmental Protection Agency

At a subregional level, the Inner Core and North Shore had the largest number of reported releases in 1999, as they are each home to one of Massachusetts' ten largest emitters. U.S. Gen New England Inc. (previously New England Power company), a coal/oil power plant in Salem, emitted 1,117,520 pounds of toxins, and Clean Harbors Inc. in Braintree emitted 710,567 pounds of toxins.

The air quality and toxic release data present an environmental justice challenge, with potential health impacts more likely to affect people in lower-income Inner Core communities.

Which communities are affected the most/least?

Table 7-4 lists the region's cities and towns with the highest and lowest number of toxin releases. The majority of communities with high numbers of releases are historic mill towns or industrial areas and tend to have lower income levels. The majority of these communities are located in the Inner Core. The subregion with the second highest number of reported releases is the North Suburban area, resulting from high toxic release levels in Wilmington and Woburn. The majority of the communities without any toxic releases in 1999 were highly residential and affluent in comparison to those with high releases.

Table 7-4: Cities and Towns with the Highest and Lowest Number of Reported Releases, 1999

Sub Region	City and Town	# Releases	SubRegion	City and Town	# Releases
North Suburban	Wilmington	41	Inner Core	Brookline	0
North Shore	Salem	31	Inner Core	Quincy	0
Inner Core	Lynn	29	Minuteman	Bolton	0
Inner Core	Waltham	29	Minuteman	Concord	0
Inner Core	Revere	28	Minuteman	Littleton	0
North Shore	Peabody	24	North Suburban	Reading	0
Inner Core	Braintree	21	North Suburban	Stoneham	0
Inner Core	Malden	21	North Suburban	Winchester	0
South Shore	Rockland	20	North Shore	Essex	0
Three Rivers	Canton	20	North Shore	Topsfield	0
Three Rivers	Walpole	20	South Shore	Cohasset	0
MetroWest	Marlborough	19	SouthWest	Holliston	0
North Suburban	Woburn	19	Three Rivers	Dedham	0
Inner Core	Everett	17	Three Rivers	Needham	0
Inner Core	Chelsea	14	Three Rivers	Sharon	0
Inner Core	Cambridge	13	Three Rivers	Westwood	0
Three Rivers	Norwood	12	Three Rivers	Milton	0

Source: U.S. Environmental Protection Agency

THE CHALLENGES AHEAD

Sprawl-type development presents challenges to our natural resources and quality of life. Low-density, dispersed growth patterns typically associated with rural communities outside the core tend to consume more land and natural resources for equivalent development than areas with more concentrated development. Stresses are evident in our water system, where the challenge of regional cooperation is key to protecting our water supplies. Negative impacts of growth also affect the denser, more urban communities, however. The air quality and toxic release data present an environmental justice challenge, with potential health impacts more likely to affect people in lower-income Inner Core communities.

REGIONAL CHALLENGES AHEAD

Growth presents the region with both an opportunity and a challenge. The following list is a summary of challenges brought to light by the analysis presented throughout the previous sections. Each challenge should also be viewed as an opportunity; as legislators, municipalities, civic groups, planning entities, and community members are faced with the task of responding to future development in a proactive and sustainable manner.

Photo: The Boston Foundation

- The increased pace of growth in the MAPC region over the past decade has given rise to a heightened awareness regarding shifting patterns of growth that are markedly changing our communities and our region. Population growth trends, especially the high growth along the periphery of the region, raise concern about the impacts of sprawl. If development outward continues without concerted planning efforts that emphasize sustainability, we face the danger of exacerbating many of the problems associated with sprawl such as rising infrastructure costs, traffic congestion, strains on water resources, and loss of open space.
- Although the economy of the region remains strong and competitive, regional equity remains a challenge. Economic growth has occurred in communities farther away from the Inner Core and traditional employment centers, as people are drawn by small town charm, easy access to major transportation routes, and tax incentives. With less diversity of housing opportunities in the suburbs and fewer transportation options to new jobs, economic segregation has become an increasing concern.
- The high cost of living in the metropolitan Boston area continues to be an impediment to regional economic growth. In order to deal with the higher cost of living, employers are forced to pay higher wages to compensate workers for the area's higher housing, energy, medical, and food costs. This presents a significant challenge to the region, as Boston ranks among the top major cities in the nation in terms of cost-of-living. If unchecked, the higher costs associated with living in and around Boston will create a competitive disadvantage for business, and could discourage new businesses from locating in the metropolitan area.

- Increasing the supply of affordable housing is one of the most serious challenges facing the MAPC region today. Housing affordability affects the region's economy and its ability to attract and retain a talented workforce. It also impacts the foundation of our neighborhoods, as families with low, moderate, and even middle incomes are increasingly finding that they are being "priced out." Other important issues facing the region in terms of housing include availability, location, proximity of jobs and housing, diversity of housing mix, fiscal concerns, and the balance of housing and other land uses.
- Equity among school districts is an important challenge for our region. Data signify the need for narrowing the performance gap among school districts, developing teaching methods and curriculum that respond to the changing needs of a diverse student body, and preparing our young people and our newcomers for the increasingly complex, technical demands of the workplace.
- When neighborhood residents invest in their community, our entire region prospers. However, we are challenged in that opportunities for community participation often compete with employment and family obligations. Although these demands limit people's discretionary time, more and more residents understand the value that lies within personal investments into a community. Initiatives that encourage community participation and interaction open important avenues for social and economic networking and opportunities. They also allow for safer neighborhoods, increased input in local decisions, and an overall improved quality of life.
- Transportation challenges increase as the region's more suburban and rural areas grow and development patterns become more decentralized and dispersed. As commuting patterns change as businesses increasingly locate outside of the Inner Core, it becomes harder to meet transportation demand through public transportation. A significant regional challenge is to manage growth in ways that make the most efficient use of our existing transportation infrastructure and promote public transit and other alternatives to single-occupant auto travel.
- As growth has expanded outside the core, wide tracks of farmland, forests, and small New England villages have been replaced by sprawling residential subdivisions, retail malls, and office parks. Yet considerable growth potential remains. MAPC's buildout analyses demonstrate that the SouthWest subregion has the largest amount of developable land and, consequently, the greatest potential for the conversion of open space to residential, commercial, and industrial uses. The Inner Core, with a much lower proportion of developable land, can nonetheless expect the most new commercial and industrial floor area and multi-family housing because it has higher-density zoning. The challenge is to ensure local regulatory planning controls serve to balance growth with preservation, and ensure that growth happens where there are resources to support it.
- The loss of open space, water shortages, traffic congestion, and degradation of air quality are leading consequences of a land-consumptive development pattern marked by the separation of homes from workplaces, schools, shops, and other uses. This degradation raises issues of environmental justice, as toxic releases and poor air quality in our region are concentrated in lower-income Inner Core communities whose residents are most likely to be affected.

The Boston region is one of the oldest in the nation. Its governmental framework consists of numerous municipal incorporations acting independently in a culture of strong home rule. It will be a significant challenge, in the years to come, to coordinate local land use to achieve sustainable growth in the MAPC district. Recognition of the crucial link between land use, housing, transportation, and natural resources is key to balancing our future needs for transportation, economic development, and quality of life. We must work together as citizens of the region to assist efforts towards planned growth while exercising our need to steward environmental and historic heritage.

To this end, MAPC is updating the region's first growth plan MetroPlan 2000, which in 1990 predicted many of the challenges the region is experiencing now. Over the next three years, MAPC will engage a broad base of diverse stakeholders to develop a regional vision and new growth strategy for metropolitan Boston. Among the fundamental objectives of the initiative are increased public awareness of the interconnectedness of municipalities within a regional system and an increased awareness and understanding of how our collective choices will affect the future quality of life of the 101 communities in the MAPC district.

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